

**IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF TEXAS
DALLAS DIVISION**

FEDERAL TRADE COMMISSION,

Plaintiff,

vs.

MATCH GROUP, INC., a corporation, and
MATCH GROUP, LLC, formerly known as
MATCH.COM, LLC, a limited liability
company,

Defendants.

Case No. 3:19-cv-02281-K

**APPENDIX IN SUPPORT OF DEFENDANTS RESPONSE TO PLAINTIFF'S
MOTION IN LIMINE TO EXCLUDE EXPERT TESTIMONY OF JAMES
LANGENFELD AS SET FORTH IN HIS REBUTTAL EXPERT REPORT TO DR.
KING'S REBUTTAL REPORT**

Defendants, by and through their counsel, submit this Appendix in support of their Response to Plaintiff's Motion in Limine to Exclude Expert Testimony of James Langenfeld as set forth in his rebuttal expert report to Dr. King's rebuttal report.

No.	Description	App. Page(s)
1	James Langenfeld Deposition Excerpts	APP 001-APP 007
2	3/15/2008 Email from K. Higgins to S. Sharma and S. Naik regarding Member Feedback	APP 008-APP 010
3	Negativity Bias, Negativity Dominance, and Contagion by Paul Rozin and Edward B. Royzman	APP 011-APP 036
4	The Negativity Bias in User Experience by Hoa Loranger	APP 037-APP 042
5	Jennifer King Deposition Excerpts	APP 043-APP 047
6	Jennifer King Expert Report	APP 048-APP 121

Dated: October 2, 2023

/s/ Angela C. Zambrano

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CERTIFICATE OF SERVICE

I hereby certify that on October 2, 2023, I caused a true and correct copy of the above and foregoing document, to be served on all counsel of record in accordance with the Federal Rules of Civil Procedure and this Court's CM/ECF filing system.

/s/ Angela C. Zambrano

Angela C. Zambrano

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REMOTE ORAL DEPOSITION OF
JAMES LANGENFELD, PH.D.
AUGUST 31, 2023
9:04 a.m. CDT

Witness Appearing From:
Washington, D.C.

Conducted Remotely Via Videoconference

Page 1

<p>1 REMOTE APPEARANCES</p> <p>2</p> <p>3 ON BEHALF OF THE PLAINTIFF:</p> <p>4 MR. M. HASAN AIJAZ</p> <p>MR. JASON MOON</p> <p>5 FEDERAL TRADE COMMISSION</p> <p>1999 Bryan Street</p> <p>6 Suite 2150</p> <p>Dallas, Texas 75201</p> <p>7 Phone: (214) 979-9386</p> <p>Fax: (214) 953-3079</p> <p>8 maijaz@ftc.gov</p> <p>jmoon@ftc.gov</p> <p>9</p> <p>10 ON BEHALF OF THE DEFENDANTS:</p> <p>(Present with the witness)</p> <p>11 MS. CHELSEA A. PRIEST</p> <p>12 SIDLEY AUSTIN LLP</p> <p>2021 McKinney Avenue</p> <p>13 Suite 2000</p> <p>Dallas, Texas 75201</p> <p>14 Phone: (214) 981-3300</p> <p>Fax: (214) 981-3400</p> <p>15 cpriest@sidley.com</p> <p>16</p> <p>17 ALSO PRESENT:</p> <p>18 Mr. Samuel Kitchens - Counsel, Match Group, LLC</p> <p>19 Ms. Jeanette Teckman - Counsel, Match Group, LLC</p> <p>20 Dr. Jennifer King - Plaintiff's Expert</p> <p>21</p> <p>22</p> <p>23</p> <p>24</p> <p>25</p> <p style="text-align: right;">Page 2</p>	<p>1 Reporter's Note:</p> <p>2 Quotation marks are used for clarity and do</p> <p>not necessarily reflect a direct quote.</p> <p>3</p> <p>4</p> <p>5</p> <p>6</p> <p>7</p> <p>8</p> <p>9</p> <p>10</p> <p>11</p> <p>12</p> <p>13</p> <p>14</p> <p>15</p> <p>16</p> <p>17</p> <p>18</p> <p>19</p> <p>20</p> <p>21</p> <p>22</p> <p>23</p> <p>24</p> <p>25</p> <p style="text-align: right;">Page 4</p>
<p>1 INDEX</p> <p>2</p> <p>3 Page</p> <p>4 Appearances 2</p> <p>5 JAMES LANGENFELD, PH.D.</p> <p>6 Examination By Mr. Aijaz 6, 292</p> <p>7 Examination By Ms. Priest 286</p> <p>8 Changes and Signature 299</p> <p>9 Reporter's Certificate 301</p> <p>10</p> <p>11 EXHIBITS</p> <p>12 No. Description Page</p> <p>13 Exhibit 1 5</p> <p>Deposition Notice</p> <p>14 Exhibit 2 18</p> <p>6/14/23 Rebuttal Expert Report to Dr. King's</p> <p>Rebuttal Report</p> <p>15 Exhibit 3 77</p> <p>16 IT Ticket</p> <p>MATCHFTC782108</p> <p>17 Confidential</p> <p>18 Exhibit 4 128</p> <p>Article entitled "The FTC in the 1980s" by</p> <p>19 Langenfeld and Scheffman</p> <p>20 Exhibit 5 134</p> <p>8/22/23 Rebuttal Expert Report of</p> <p>21 James Langenfeld, Ph.D.</p> <p>22 Exhibit 6 189</p> <p>Article entitled "10 Things to Know About</p> <p>23 Completion Rates" by Sauro</p> <p>24 Exhibit 7 193</p> <p>Article entitled "The High Cost of Task Failure</p> <p>25 on Websites" by Sauro</p> <p style="text-align: right;">Page 3</p>	<p>1 PROCEEDINGS</p> <p>2 (Exhibit 1 marked)</p> <p>3 THE REPORTER: This is the deposition of</p> <p>4 Dr. James Langenfeld, taken in the matter of Federal</p> <p>5 Trade Commission v. Match Group, Inc., filed in the</p> <p>6 United States District Court, Northern District of</p> <p>7 Texas, Dallas Division, Case No. 3:19-cv-02281-K.</p> <p>8 Today's date is August 31, 2023. The time is</p> <p>9 9:04 a.m.</p> <p>10 My name is Karen Shelton, and I am</p> <p>11 reporting this deposition remotely from Fort Worth,</p> <p>12 Texas. The witness is located in Washington, D.C.</p> <p>13 Counsel, please state your appearances,</p> <p>14 beginning with the noticing attorney.</p> <p>15 MR. AIJAZ: My name is Hasan Aijaz with</p> <p>16 the FTC.</p> <p>17 MR. MOON: My name is Jason Moon with the</p> <p>18 FTC. I've got my audio off so we don't have</p> <p>19 feedback. I'm on a separate computer.</p> <p>20 MS. PRIEST: Chelsea Priest with Sidley</p> <p>21 Austin on behalf of defendants.</p> <p>22 (The witness was sworn by the reporter.)</p> <p>23 MR. AIJAZ: All right. Thank you.</p> <p>24 ///</p> <p>25 ///</p> <p style="text-align: right;">Page 5</p>

<p>1 quantitative method or a qualitative method?</p> <p>2 A. Well, the way -- the way she does it, it's</p> <p>3 a little bit of both.</p> <p>4 Q. And what is your background -- go ahead.</p> <p>5 I'm sorry.</p> <p>6 A. Go ahead. I'm sorry. I didn't mean to</p> <p>7 interrupt you.</p> <p>8 Q. No, no, I interrupted you. Please, go</p> <p>9 ahead.</p> <p>10 A. And I've lost the train. I'm sorry. You</p> <p>11 better do it again.</p> <p>12 Q. Okay. So -- well, what is your background</p> <p>13 in qualitative methods?</p> <p>14 A. My background -- well, whenever you do</p> <p>15 economics, you consider the qualitative evidence.</p> <p>16 You try to do quantitative tests to test out whether</p> <p>17 there's qualitative evidence and quantitative</p> <p>18 evidence. In most economic analyses, both are</p> <p>19 considered.</p> <p>20 Q. So are you an expert in qualitative</p> <p>21 methodologies?</p> <p>22 A. Well, it depends what you mean by qual- --</p> <p>23 THE WITNESS: Sorry.</p> <p>24 MS. PRIEST: Objection, vague.</p> <p>25 A. It depends what you mean by qualitative</p> <p style="text-align: right;">Page 30</p>	<p>1 Then the quantitative test would be to</p> <p>2 look after that to see if prices went up. So</p> <p>3 that's -- you match, you marry the two together in</p> <p>4 the economics sphere. I'm not claiming I can do</p> <p>5 qualitative psychological analysis, but that's the</p> <p>6 type of thing that economists do all the time.</p> <p>7 Q. Okay. So you had mentioned statistics and</p> <p>8 sampling as areas of expertise with respect to this</p> <p>9 first opinion we discussed. Are there any other</p> <p>10 areas of expertise that support -- that you used in</p> <p>11 arriving at your opinion?</p> <p>12 A. Well, similar to the example I just gave,</p> <p>13 I looked to see -- I tested hypotheses. If you</p> <p>14 were -- if you had trouble with the design flow</p> <p>15 being not simple, the hypothesis test would be does</p> <p>16 everyone -- did people actually try the -- or get on</p> <p>17 to try to resign.</p> <p>18 And the hypothesis would be, if that was</p> <p>19 yes, if everybody who was in the sample had gotten</p> <p>20 on and then did resign, that would be consistent</p> <p>21 with the hypothesis that this may be a</p> <p>22 representative set of -- but that's just not what we</p> <p>23 find at all. We find that, like I said, over</p> <p>24 43 percent of the people never even got on. So</p> <p>25 that's a hypothesis test. It's a refutable</p> <p style="text-align: right;">Page 32</p>
<p>1 methodologies. I'm used to qualitative</p> <p>2 methodologies and have used qualitative</p> <p>3 methodologies in the realm of economics.</p> <p>4 Q. Okay. What qualitative methodologies are</p> <p>5 you an expert in?</p> <p>6 A. Qualitative economics within the field of</p> <p>7 economics.</p> <p>8 Q. Okay. Can you give me the simplified</p> <p>9 version of what qualitative methodologies in the</p> <p>10 field of economics means?</p> <p>11 A. I can give you an example. Would that</p> <p>12 work too?</p> <p>13 Q. Yes, that would be great.</p> <p>14 A. For example, let's get away from this type</p> <p>15 of -- and put it into a different field just to make</p> <p>16 it -- hopefully it'll make it a little clearer.</p> <p>17 If you're talking about, for example, a</p> <p>18 price fixing case, one needs to look at the -- to</p> <p>19 have an economic opinion, you need to look at what</p> <p>20 the evidence is in terms of actions. For example,</p> <p>21 was there a meeting, did that result in higher</p> <p>22 prices. So to identify what the hypothesis to be</p> <p>23 tested is, you need to have a qualitative analysis</p> <p>24 to say this is where there was arguably a meeting of</p> <p>25 the minds to raise price.</p> <p style="text-align: right;">Page 31</p>	<p>1 hypothesis test that economists and most experts do.</p> <p>2 Q. Okay. So you're an expert in hypothesis</p> <p>3 testing. Are there any other expertise, areas of</p> <p>4 expertise that you employed in arriving at this</p> <p>5 conclusion?</p> <p>6 A. It's vague. I mean, I've applied my</p> <p>7 economic skills, and there are a variety of subsets</p> <p>8 into those economic skills. Those are the ones that</p> <p>9 I've applied.</p> <p>10 Q. Okay. So going to kind of the next</p> <p>11 high-level opinion, that "Research indicates</p> <p>12 commenters do not represent the views of most users</p> <p>13 and are more likely to have extreme negative views."</p> <p>14 You see that, right?</p> <p>15 A. I do.</p> <p>16 Q. Okay. So a similar type of question here</p> <p>17 is, what are the areas of expertise that you</p> <p>18 employed in arriving at this opinion?</p> <p>19 A. Well, this was -- it's a well-known thing.</p> <p>20 If you look at the seven articles, I believe, that I</p> <p>21 reference there -- and there are more -- a couple of</p> <p>22 them are specific to online testing and on -- and</p> <p>23 behavioral economics, which is another subset of</p> <p>24 economics which goes in that general category that</p> <p>25 I've just described.</p> <p style="text-align: right;">Page 33</p>

<p>1 Those find the negativity bias. And I've 2 also commented on others that actually go beyond 3 economic-type analyses that find the same sort of 4 things. Some of them are -- some of them are 5 psychological testing, showing people cards and 6 whether they give a negative or a positive, the 7 reaction that they get, their actually human 8 electrostatic reaction to these things. 9 So I've mentioned those also just to show 10 that it's not only the economics group, but others 11 recognize this negativity bias.</p> <p>12 Q. And are you an expert in behavioral 13 economics?</p> <p>14 A. It's one of the areas that I've practiced 15 in, had opinions in, yes.</p> <p>16 Q. I'm sorry. It's one of the areas you 17 what?</p> <p>18 A. It's one area that I have offered opinions 19 in and analyzed over my career.</p> <p>20 Q. Are you a expert in psychology?</p> <p>21 A. I'm not an expert in psychology.</p> <p>22 Q. Are you an expert in user experience?</p> <p>23 MS. PRIEST: Objection, vague.</p> <p>24 A. Yeah, I'm not quite sure what "user 25 experience" means in this context. I'm certainly</p> <p style="text-align: right;">Page 34</p>	<p>1 interaction, in that field?</p> <p>2 MS. PRIEST: Objection, vague.</p> <p>3 A. Once again, just -- I've looked at digital 4 platforms and how consumers respond to it from an 5 economics point of view and from a behavioral point 6 of view in terms of what people actually do and what 7 they don't do.</p> <p>8 In terms of studying, you know, the 9 electrodes or something along those lines, I 10 really -- I haven't -- you know, to see what the 11 actual psychological or the actual physiological 12 experience is, no, I haven't done that.</p> <p>13 Q. Are you an expert in business marketing?</p> <p>14 A. I've been qualified as an expert in that. 15 I wouldn't say it's actually my -- a primary area of 16 my interest, but I have been qualified for that, at 17 least in one case I can think of.</p> <p>18 Q. What was the name of that case?</p> <p>19 A. It was Menasha -- it's been awhile ago. 20 Menasha versus -- I'd have to go back and look at my 21 report, look at my -- Menasha was one of the 22 litigants.</p> <p>23 Q. Would you mind spelling that if you recall 24 how it's spelled?</p> <p>25 A. M-E-N-S-H-A. (sic)</p> <p style="text-align: right;">Page 36</p>
<p>1 somebody who knows how to study consumer behavior, 2 which I've done in this case and many others. But 3 if that's a charge term, I can't really address 4 that.</p> <p>5 Q. Yeah, I'm glad you addressed that or 6 picked up on that. This is a term that's used in 7 the field of human-computer interaction, so user 8 experience, how users may interact with a particular 9 design, for example. Are you an expert in that 10 field?</p> <p>11 MS. PRIEST: Objection, vague.</p> <p>12 A. I mean, I've done economics and written 13 articles on consumer experiences with digital 14 platforms and things like that. I don't know that 15 that addresses the box you're looking at.</p> <p>16 Q. So you're not familiar with the term of 17 art of "user experience" and "user experience 18 design"?</p> <p>19 A. I mean, I've certainly heard the term. 20 But can I provide you a specific definition as I sit 21 here today? The answer is, no, I can't give you a 22 specific -- I mean, I've certainly seen the term. 23 I'm familiar with the term. What exactly it means 24 maybe you can define for me and then I'll respond.</p> <p>25 Q. Are you an expert in human-computer</p> <p style="text-align: right;">Page 35</p>	<p>1 Q. Thank you. And are you an expert in the 2 field of behavioral psychology?</p> <p>3 A. Behavioral economics, probably not 4 behavioral psychology, if I understand the term 5 you're asking.</p> <p>6 Q. Yeah. So to reask it, are you an expert 7 in the field of behavioral psychology?</p> <p>8 MS. PRIEST: Objection, asked and 9 answered.</p> <p>10 A. I'm not quite sure of the specific 11 definition you are looking for here. Maybe you 12 could provide it. But I'm not a -- but I'm an 13 expert in behavioral economics, not behavioral 14 psychology, if I understand the question correctly.</p> <p>15 Q. Okay. And are you an expert in negativity 16 bias?</p> <p>17 MS. PRIEST: Objection, vague.</p> <p>18 A. I am an economist who over the years has 19 taken this into consideration. I've not done 20 specific research on it, but I've relied on research 21 on a number of occasions trying to evaluate the -- 22 what consumer behavior is in a variety of contexts.</p> <p>23 Q. Have you ever been qualified by a court to 24 give opinion testimony in the field of negativity 25 bias?</p> <p style="text-align: right;">Page 37</p>

<p>1 MS. PRIEST: Objection, form.</p> <p>2 A. I've been allowed to testify as to what</p> <p>3 the research is, as in this case, as part of a more</p> <p>4 general issue. But specifically that, I don't</p> <p>5 recall.</p> <p>6 Q. And what case or cases are you referring</p> <p>7 to you said you were allowed to testify as to that?</p> <p>8 A. Whenever you do -- whenever you look at</p> <p>9 consumer behavior, and this is true for research,</p> <p>10 economic research, and this is true in not every</p> <p>11 case I've been involved with, but many cases that</p> <p>12 I've done an economics analysis in and when I've</p> <p>13 taught law and economics, frankly. Looking at</p> <p>14 negativity bias is -- if it's -- can be. It isn't</p> <p>15 always relevant based on the information that you</p> <p>16 have.</p> <p>17 So if I'm looking at individual behavior</p> <p>18 in a price fixing case or something else like that,</p> <p>19 any type of matter, you are aware it's there.</p> <p>20 Sometimes it matters, sometimes it doesn't.</p> <p>21 Q. Now, what is your experience with respect</p> <p>22 to analyzing consumer cancellation of subscriptions</p> <p>23 on digital platforms?</p> <p>24 MS. PRIEST: Objection, vague.</p> <p>25 A. I've certainly a lot of experience with</p> <p style="text-align: right;">Page 38</p>	<p>1 A. Yes.</p> <p>2 Q. Okay. Well, they didn't talk about</p> <p>3 cancellations. So as you sit here today, you can't</p> <p>4 recall any articles or studies relating to the</p> <p>5 cancellation of subscriptions on digital platforms,</p> <p>6 correct?</p> <p>7 A. I can't think of one offhand, you're</p> <p>8 right.</p> <p>9 Q. Okay. Just a few more questions and I</p> <p>10 think we could take a break. Or do you want to keep</p> <p>11 going? How are you feeling, Dr. Langenfeld?</p> <p>12 A. I'm fine, so whenever you think it's a</p> <p>13 good time to break, I'm fine with that.</p> <p>14 Q. Okay. I want to go back to behavioral</p> <p>15 economics. Could you tell me what materials are</p> <p>16 considered authoritative in that field?</p> <p>17 A. I mean --</p> <p>18 MS. PRIEST: Objection, vague.</p> <p>19 A. I mean, there's a whole literature out</p> <p>20 there. I'm not sure I can go through and point to</p> <p>21 specific ones. It's a massive area.</p> <p>22 Q. Right. So what is the basis for your</p> <p>23 expertise in that area?</p> <p>24 A. I've studied the behavior of consumers.</p> <p>25 That's what behavioral economics is about.</p> <p style="text-align: right;">Page 40</p>
<p>1 digital platforms, both in terms of analysis and in</p> <p>2 terms of articles that I've written. I don't think</p> <p>3 there's a specific case where, unlike this case,</p> <p>4 that that's been the target of the issues here. I</p> <p>5 mean, no two cases are ever exactly alike. And so</p> <p>6 although I'm familiar with the area, I don't think</p> <p>7 I've given opinions specific to that before.</p> <p>8 Q. And what research did you review regarding</p> <p>9 cancellation of subscriptions on digital platforms?</p> <p>10 MS. PRIEST: Objection, vague.</p> <p>11 A. Well, it's the basic economic tools to set</p> <p>12 up the hypotheses. You don't -- I mean, it's the</p> <p>13 economics. I mean, it's just the basic economics.</p> <p>14 I don't think I refer to a specific textbook, but if</p> <p>15 you wanted to, I could certainly do that.</p> <p>16 Q. Well, actually what I'm asking is, did you</p> <p>17 look at any research, any articles that refer to the</p> <p>18 cancellation of subscriptions on digital platforms?</p> <p>19 A. One of the articles I looked at dealt with</p> <p>20 the interaction on digital platforms. And I -- I'll</p> <p>21 be honest. I don't recall specifically if that was</p> <p>22 an issue that was raised in that. It was in one of</p> <p>23 the negativity bias issues.</p> <p>24 Q. Are you talking about the article written</p> <p>25 by Hu and Zhang?</p> <p style="text-align: right;">Page 39</p>	<p>1 Q. And what --</p> <p>2 A. Take a look at what -- go ahead.</p> <p>3 Q. No, I'm sorry. The lag has gotten me a</p> <p>4 couple of times. Please continue. So the question</p> <p>5 was, what is the basis for your expertise in this</p> <p>6 area?</p> <p>7 A. I've reviewed the area and done a number</p> <p>8 of tests that address in particular -- and taught</p> <p>9 actually some of the key findings, for example, of</p> <p>10 behavioral economics.</p> <p>11 Q. When you say "taught," when was the last</p> <p>12 time you taught a class on behavioral economics?</p> <p>13 A. I taught classes on law and economics,</p> <p>14 which the subset addressed behavioral economics as</p> <p>15 most of the law and economics textbooks now have.</p> <p>16 It's probably been two or three years ago.</p> <p>17 Q. Okay. Do you have any research in this</p> <p>18 area? When I say "research," any, you know,</p> <p>19 published articles?</p> <p>20 A. Like I said, I've taught it. I'd have to</p> <p>21 go back and look. I don't recall off the top</p> <p>22 something that was just focused on behavioral</p> <p>23 economics rather than that would influence the</p> <p>24 article. So, yeah, I'd have to go back and look.</p> <p>25 Q. And are there specific instances in which</p> <p style="text-align: right;">Page 41</p>

<p>1 very satisfied or somewhat satisfied, and another 2 9 percent, I believe -- 9 percent, yes, said that 3 they were neither satisfied nor dissatisfied -- 4 Q. What is the -- 5 A. -- of people who actually complained. 6 Q. And, sorry, what is the universe? Is this 7 of those of Dr. King's sample or those of the entire 8 universe? 9 MS. PRIEST: Objection, vague. 10 A. It's the data analyzed by Dr. King, so 11 it's hers. 12 Q. Okay. And you say -- 13 A. It's limited to hers. 14 Q. Okay. And you say "satisfied." Satisfied 15 with what? 16 MS. PRIEST: Objection, vague. 17 A. Yeah, I mean, looking at the entry, they 18 checked one of these boxes. It's one of the columns 19 that was in the data set. 20 Q. Okay. But what does that mean? Were they 21 satisfied with the response from the customer care 22 team? 23 MS. PRIEST: Objection, vague, 24 speculative. 25 A. Yeah, I don't believe they said they were</p> <p style="text-align: right;">Page 118</p>	<p>1 unable to find the cancellation flow? 2 MS. PRIEST: Objection, vague. Misstates 3 testi- -- or misstates the evidence. 4 A. Do you know -- I mean, there are not many 5 that explicitly state that. I think some might, but 6 a lot of them are general and some of them are 7 fairly actually not very coherent explana- -- 8 observations, if that's what you're asking. 9 Q. So -- 10 A. I mean, there's -- go ahead. I'm sorry. 11 Q. And just in general, my apologies. You 12 know, the online thing, I've jumped over you a 13 couple of times, so I appreciate your patience with 14 that. 15 So this is going to be in Section 9 of 16 your report which starts on page 24 where you 17 conduct I'll just call it an analysis looking at 18 consumer behavior. And you said that some of these 19 users didn't even enter the cancellation process, 20 right? 21 A. Correct. 22 Q. Now, isn't it true that some of these 23 people may not have entered the cancellation process 24 precisely because they couldn't find it? 25 MS. PRIEST: Objection, speculative.</p> <p style="text-align: right;">Page 120</p>
<p>1 explicit about why they were satisfied. 2 Q. Well, I'm just asking. Do you know what 3 they were satisfied with? 4 MS. PRIEST: Objection, vague, 5 speculative, asked and answered. 6 A. It was a customer who walked away 7 satisfied according to their -- according to the 8 data that was collected. That's what the data says. 9 It doesn't elaborate. The data does not elaborate 10 on that. 11 Q. So just to be clear, you don't know what 12 the satisfaction was being expressed with regards to 13 what, right? 14 MS. PRIEST: Objection, vague, misstates 15 testimony. 16 A. It's what it says in the entries. It 17 doesn't provide an explanation. 18 Q. Okay. Do you know what the question was 19 to which people were responding? 20 A. I actually -- you know, I actually don't 21 recall that sitting here. 22 Q. Okay. So regarding the complaints 23 Dr. King analyzed, we talked a little bit about, you 24 know, the reasons that they were contacting. And 25 isn't it true that some of these commentators were</p> <p style="text-align: right;">Page 119</p>	<p>1 A. Yeah, I mean, I've not seen evidence that 2 suggests that that's a significant problem, but -- 3 and I've not seen it -- it's not obvious from the 4 630 or at least the 592 ones that I analyze here. 5 Q. Okay. So you say of the 56.8 percent of 6 users that entered the flow, almost 90 percent were 7 able to cancel their subscription, right? 8 A. Yes, of the balance, yes. 9 Q. When you say "of the balance," you mean of 10 the people who entered, nearly 90 percent were able 11 to cancel, right? 12 A. The ones who actually did enter the 13 cancellation process, yes. 14 Q. Okay. Does that roughly 90 percent 15 include people who canceled via chat, email, phone, 16 or fax? 17 A. That's a question. Let me think. 18 I have to go back and check. I believe 19 that's -- if they were able to -- if the data shows 20 if they successfully canceled during their term, 21 that 90 percent of them did. I'd have to go back 22 and look. I just don't recall whether that field 23 was limited to people online or involved everything. 24 I'd have to go back and look at the data. 25 Q. Okay. So if it does include people who</p> <p style="text-align: right;">Page 121</p>

1 contains any changes and the reasons therefor;
 2 ____ was not requested by the deponent or a
 3 party before the completion of the deposition.

4 I further certify that I am neither
 5 counsel for, related to, nor employed by any of the
 6 parties in or counsel to this action, nor am I
 7 financially or otherwise interested in the outcome
 8 of this action.

9 Certified to by me this 8th day of
 10 September, 2023.

11

12

13

Karen L. Shelton

Karen L. Shelton, CSR, KDR, CRR

14

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Page 302

1 cpriest@sidley.com

2

September 8, 2023

3

RE: Federal Trade Commission v. Match Group, Inc., Et Al.

4

DEPOSITION OF: James Langenfeld , Ph.D. (# 6079281)

5

The above-referenced witness transcript is

6

available for read and sign.

7

Within the applicable timeframe, the witness

8

should read the testimony to verify its accuracy. If

9

there are any changes, the witness should note those

10

on the attached Errata Sheet.

11

The witness should sign and notarize the

12

attached Errata pages and return to Veritext at

13

errata-tx@veritext.com.

14

According to applicable rules or agreements, if

15

the witness fails to do so within the time allotted,

16

a certified copy of the transcript may be used as if

17

signed.

18

Yours,

19

Veritext Legal Solutions

20

21

22

23

24

25

Page 303

77 (Pages 302 - 303)

From: Kristin Higgins <Kristin.Higgins@match.com>
Sent: Monday, March 5, 2018 11:47 AM
To: Sushil Sharma; Shamika Naik
Cc: Krystal Roloff
Subject: Member Feedback - Survey Results
Attachments: Match Member Feedback 2017.xlsm; Match Member Feedback 2018.xlsm

Hello,

The post Care Phone Survey is below. I have attached our member feedback results for 2017 and 2018.



Overall, how satisfied are you regarding your experience with the Match site?

- ☐ Very Satisfied
☐ Somewhat Satisfied
☐ Neither Satisfied nor Dissatisfied
☐ Somewhat Dissatisfied
☐ Very Dissatisfied

Overall, how would you rate the way the Customer Care agent assisted you?

- ☐ Very Satisfied
☐ Somewhat Satisfied
☐ Neither Satisfied nor Dissatisfied
☐ Somewhat Dissatisfied
☐ Very Dissatisfied

For each of the following items, please specify your level of satisfaction. Please specify a value ranging from 1 to 5, where 1 reflects that you are very d

Waiting time before we answered your call.
Our ability to understand the reason for your call.
Courtesy and friendliness shown to you by our team.
Our ability to clearly explain and clarify the reason for your call.
Our commitment to solving your issue.
Our speed in answering your query.

Please provide any additional feedback.

Submit

Please let me know if you have any questions,
Kristin



Kristin Higgins | Manager, Community Experience
 Community Operations | Match
 8750 N. Central Expressway, Suite 1400 | Dallas, TX 75231
 Office: 972.638.8688, Mobile: 214.801.6982

Negativity Bias, Negativity Dominance, and Contagion

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University of Pennsylvania

We hypothesize that there is a general bias, based on both innate predispositions and experience, in animals and humans, to give greater weight to negative entities (e.g., events, objects, personal traits). This is manifested in 4 ways: (a) negative potency (negative entities are stronger than the equivalent positive entities), (b) steeper negative gradients (the negativity of negative events grows more rapidly with approach to them in space or time than does the positivity of positive events), (c) negativity dominance (combinations of negative and positive entities yield evaluations that are more negative than the algebraic sum of individual subjective valences would predict), and (d) negative differentiation (negative entities are more varied, yield more complex conceptual representations, and engage a wider response repertoire). We review evidence for this taxonomy, with emphasis on negativity dominance, including literary, historical, religious, and cultural sources, as well as the psychological literatures on learning, attention, impression formation, contagion, moral judgment, development, and memory. We then consider a variety of theoretical accounts for negativity bias. We suggest that 1 feature of negative events that make them dominant is that negative entities are more contagious than positive entities.

Brief contact with a cockroach will usually render a delicious meal inedible. The inverse phenomenon—rendering a pile of cockroaches on a platter edible by contact with one's favorite food—is unheard of. More modestly, consider a dish of a food that you are inclined to dislike: lima beans, fish, or whatever. What could you touch to that food to make it desirable to eat—that is, what is the anticockroach? Nothing! And the cockroach is far from unique: there is a wide variety of animals (e.g., worms, caterpillars, slugs, spiders) that share the cockroach potency, along with a variety of microbially or toxin-contaminated objects. One of the best generic descriptions of this relative power of negative contamination is embedded in an age-old Russian adage: “A spoonful of tar can spoil a barrel of honey, but a spoonful of honey does nothing for a barrel of tar.” This apparent dominance of negative over positive contamination is played out on a vast human–social scale among the large traditional segment of 800,000,000 living Hindu Indians. People of higher castes are easily con-

taminated—that is, lowered in social status—by contact with members of lower castes. The contamination often occurs by eating food prepared by a lower caste. On the other hand, when people of lower castes consume foods prepared by higher castes, there is no corresponding elevation in their status. Stevenson (1954) summarized this feature of the caste system with the phrase “pollution always overcomes purity” (p. 50). The caste system pulls downward; it is easy to pollute and hard to purify.

Similarly, in many Western and non-Western religious traditions, becoming possessed by a malevolent demonic force is a relatively brief and easy affair (Oesterreich, 1974), whereas the reversal of the possession requires the painstaking, prolonged, and often injurious ritual of exorcism. On the other hand, in these same traditions, becoming “holy” or “saintly” usually involves a long moral trajectory of positive deeds, a state that can be compromised easily by one or a few immoral acts. The general principle that, for forgiveness to be achieved, the degree of acceptable expiation must dramatically exceed that of the initial fault, is dramatically played out in the Christian concept of redemption from original sin. In a number of traditions, there are some losses to one's purity, such as the sully of female sexual honor through premarital sex or illicit affairs, which cannot be remedied at all.

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The dominance of negative contamination affords a particularly striking demonstration of what we take to be a very general principle, a principle that holds across a wide range of domains, and in nonhuman as well as human animals. The principle, which we call negativity bias, is that in most situations, negative events are more salient, potent, dominant in combinations, and generally efficacious than positive events. (There are exceptions to this claim, but they constitute a minority of cases and often involve special circumstances).

The principle of negativity bias has not escaped the attention of thinkers in many disciplines. The principle has been noted by a number of prominent humanists, including Shakespeare, Pushkin, and Schopenhauer (see quotes later in this article). Contemporary psychologists have pointed to forms of negativity bias in particular domains, and in general. These contributions will be discussed in more detail later, but to acknowledge our predecessors, we note here that, in a political science journal, Jordan (1965), summarizing results from different studies, concluded that “a positive attitude or positive affect does not have an effect on measured behavior oppositely equivalent to the effect of a negative attitude or negative affect” (p. 315). Kanouse and Hanson (1972) identified a negative bias effect with respect to a well-defined range of phenomena. Guido Peeters and his colleagues have produced many demonstrations of negative bias, particularly in the context of attitude and impression formation (Lewick, Czapinski, & Peeters, 1992; Peeters, 1971, 1989; Peeters & Czapinski, 1990).

Negativity bias has been the focus of attention in a few other lines of thought in psychology. The greater general potency of negative events is at the core of prospect theory, as described in the prospect function and labeled as *loss aversion* (Kahneman & Tversky, 1979; Tversky & Kahneman, 1991). Taylor (1991) focused on the negative–positive asymmetry, in many of its manifestations, in the framework of demonstrating adaptive asymmetrical coping processes involved in neutralizing the greater negative potency. More recently, in a series of articles, John Cacioppo and his collaborators (Cacioppo & Bernston, 1994; Cacioppo, Gardner, & Bernston, 1997, 1999) noted a negativity bias effect in a number of domains, including three of the four that we document and organize in this article. Finally, independently of our work, and at the same time, a review of articles emphasizing negativity bias, particularly in the social interaction and impressions domain, has been completed (Baumeister, Bratslavsky, Finkenauer, & Vohs, in press).

Although negativity bias is often striking, it is far from universal. On the contrary, there is sufficient evidence for a positive bias that an entire book, *The Polyanna Principle* (Matlin & Stang, 1978), has amply

documented the wide range of positive biases. These appear in higher frequency of positive words, positive experiences, and positive views of the world, and in other domains. This puts us in the peculiar position of describing what we believe to be a basic tendency in the face of documented evidence for the opposite tendency, as well.

Guido Peeters and his colleagues (e.g., Lewick et al., 1992; Peeters, 1971, 1989; Peeters & Czapinski, 1990) directly addressed this apparent contradiction, which they described as positive–negative asymmetry. They treated the evidence for both positive and negative biases in a sophisticated and balanced way. They noted the interesting fact that, because negative events are much rarer than positive events, it is adaptive to assume the positive (the most likely occurrence) while being watchful for the dangerous negative. Thus, many examples of positive bias result from the same basic fact about the world, the dominance of positive experiences, as does negativity bias. Peeters and his colleagues have set the stage, appropriately, for a careful examination of the contexts in which each type of bias appears, and attempt to bring both phenomena under one conceptual umbrella. They have pinpointed the issue in noting the greater frequency, but lesser “urgency,” of positive events. Organisms must be most efficient at dealing with the most frequent occurrences, but also the most important occurrences. Cacioppo and his colleagues (Cacioppo & Bernston, 1994; Cacioppo, Gardner, & Bernston, 1997, 1999) also recognized positive and negative bias; they focused on a negativity bias as a more rapid recruitment of negativity than positivity with increasing strength of elicitors and a positivity offset defined in terms of a bias to treat relatively neutral entities as weakly positive.

Our contribution in this article to the prior work is fivefold.

1. We extend the range of domains in which negativity bias has been noted.
2. We present a taxonomy of negativity bias phenomena.
3. We clearly distinguish the special and, we believe, most robust and informative subclass of negativity bias phenomena: negativity dominance.
4. In particular, we highlight the previously unnoted area of contagion and contamination, which we believe is the most robust and informative subclass of negativity dominance. We argue that contagion and contamination matters both as a domain in which negativity bias makes some of its most dramatic appearances and a possible mechanism that mediates negativity bias effects in other spheres.
5. We review and extend, in light of the first four points, the significance, extent, and theoretical ac-

counts of the various negativity bias phenomena and attempt to include many of the phenomena of positive bias under the same theoretical accounts.

We regard our work as being largely complementary to the simultaneous work of Baumeister et al. (in press). The two articles differ both in respect to the structure of their arguments and the range of examples they proffer in support of the general proposition that negativity bias is a pervasive and consequential feature of human existence. However, the main difference between our works lies elsewhere. Baumeister et al. analyzed the phenomenon at hand primarily in terms of independent, orthogonal influences of bad and good things on behavior and cognition. Our work, on the other hand, emphasizes the tendency of the effects of the negative to dominate (or even utterly overwhelm) those of the positive when the two are blocked together to form a single configuration. This echoes the Gestalt-like claim that, in a wide range of cases, the “cognitive interaction” of two stimuli, such as those denoting evaluatively positive or negative personal attributes and brought together to form a novel composite, cannot be accurately anticipated from prior knowledge of the values of the two stimuli taken apart (Rokeach & Rothman, 1965; Royzman, 2000).

Four Aspects of Negativity Bias

In this taxonomic section we propose three or four types of negativity bias: *negative potency*, *greater steepness of negative gradients*, *negativity dominance*, and *negative differentiation*.

Negative Potency

The principle of negative potency asserts that, given inverse negative and positive events of equal objective magnitude, the negative event is subjectively more potent and of higher salience than its positive counterpart. More generally, the claim is that negative events are more potent with respect to their objective magnitude than are positive events. This is described in the prospect function and is at the core of the loss aversion phenomenon (Kahneman & Tversky, 1979; Tversky & Kahneman, 1991). For example, in the domain of politics, Bloom and Price (1975) showed that short-term economic conditions, when they are downturns, reduce the vote for the party of the incumbent in American presidential elections, whereas upturns have virtually no effect. The endowment effect is perhaps the purest and most robust instantiation of loss aversion (Kahneman, Knetsch, & Thaler, 1990); people will demand much more to give up something they possess (a loss) than they will pay to obtain the same item (a gain).

Loss aversion has been demonstrated in a number of domains, but it does not always occur. The demonstration of negative potency is unfortunately limited, because it requires a metric (usually money) to establish the objective equality of negative and positive events (e.g., losing and gaining \$100, or 10 lb of weight, or 5° in temperature), or comparison of two contexts for the same material entity (as in the case of the endowment effect).

Greater Steepness of Negative Gradients

There is minimal but provocative evidence that negative events grow more rapidly in negativity as they are approached in space or time than do positive events. There have been only a few empirical attempts to demonstrate this, but we consider this principle potentially important. The clearest demonstrations and discussions of this phenomenon appear in the animal learning literature (Brown, 1948; N. E. Miller, 1944; discussed later). Recently, Cacioppo and colleagues (Cacioppo & Bernston, 1994; Cacioppo, Gardner, & Bernston, 1997, 1999) discussed this asymmetry and incorporated it into their computational model of evaluative space. In particular, they posited steeper negative gradients (which they described as negativity bias) along with a tendency for a net positive outcome with very weak negative and positive inputs (which they described as positivity offset). In addition to the work of Brown and Miller, they cited evidence from the impressions literature, suggesting that negative events dominate positive events only when both are strong.

It is possible that steeper negative gradients are simply a manifestation of negative potency because the steeper gradient follows from the fact that additional negative units (measured as stimuli) will produce larger psychological effects than additional positive units. However, in light of the phenomenon of positivity offset, the gradient effect may be distinct from negative potency because at low levels negative inputs do not seem to be more potent than “equivalent” positive inputs. Negative potency might result from higher subjective levels of negative stimuli at all stimulus levels, so that the two functions might have the same slope but the negative function might have a higher intercept. However, the gradient results suggest that this is not the case; rather, the negative functions seem to have a lower intercept but a higher slope.

Negativity Dominance

According to the principle of negativity dominance, the holistic perception and appraisal of integrated negative and positive events (or objects, individuals,

hedonic episodes, personality traits, etc.) is more negative than the algebraic sum of the subjective values of those individual entities. The entities being summed algebraically are not stimuli, but evaluations; hence, negativity dominance occurs after we take into any possible effect of negative potency and is, in principle, independent of it. Negativity dominance does not require, operationally, the use of objectively equated or objectively measured stimuli. We consider negativity dominance the most robust and most common exemplification of negativity bias, and this article focuses primarily on this principle. All of the examples offered at the beginning of this article illustrate negativity dominance. In the purest condition, negativity dominance holds that the combination of events of equal but opposite subjective valence will be negative. Thus, if losing \$100 is worse than winning \$100 is good, we have an instance of potency. But if we then find that losing \$100 is as bad as winning \$150 is good, and that losing \$100 and winning \$150 is negative, then we have negativity dominance.

Kanouse and Hanson (1972) recognized the particular importance of negativity dominance. They framed the power of negative properties in terms of their ability to interfere with enjoyment of positive aspects, as when a rancid taste completely ruins the good taste of a soup. They suggested that “negative components of a complex object are overweighted only when the good and the bad are found together in one object, when they are inseparable” (p. 58). Moreover, as one of us noted elsewhere (Royzman, 2000), it is precisely when negative and positive stimuli are “blended together” to form a novel gestalt that one sees one of the most remarkable manifestations of the dominance principle—“negative overassimilation,” in which a property that is evaluated negatively in its own right “may be judged even more negatively when ... lodged in a positive subject” (Rokeach & Rothman, 1965, p. 130), so that “irresponsible father” could be judged more negatively than “irresponsible” (Rokeach & Rothman, 1965) and “loyal martinet” more negatively than “martinet” per se.

We find it useful to draw a further distinction between the *synchronic* (simultaneous) and the *diachronic* (successive) manifestations of negativity dominance. The former concerns the appraisal of negative and positive components as co-occurring constituents of a single whole (as in the case of forming a holistic impression of a person on the basis of a list of adjectives that describe that person’s negative and positive traits). Under these conditions, the negative component would be disproportionately more influential in determining the overall appraisal than the positive components of comparable magnitude. The diachronic subtype, on the other hand, is revealed in the cancellation of positive by negative events, and vice versa (as in the case of determining how many lives a murderer

has to save to neutralize one act of murder). The cockroach and the purification rites examples cited at the beginning of this article embody distinctly the diachronic subtype of negativity dominance.

We believe that instances of negativity dominance afford us more dramatic and effectual means of showing that the core of the positive–negative asymmetry in both physical and moral domains may be the fact that the corrupting or “devaluing” power of bad things is greater than the redeeming power of good things (Royzman & Kumar, 2001). The image that comes to mind from the physical domain is that of a single cancerous growth or germ that radiates itself through and ultimately consumes a perfectly healthy body. The image that comes to mind from the moral domain is that of a single vice corrupting and perverting and bringing the moral downfall of an otherwise perfectly good person.

Greater Negative Differentiation

Negativity bias manifests itself in the fact that negative stimuli are generally construed as more elaborate and differentiated than the corresponding positive stimuli. This phenomenon of greater negative differentiation represents, in our view, yet another facet of the general negativity bias principle. The most reliable finding consistent with this phenomenon is that the vocabulary used to describe the qualities of evaluatively negative phenomena is far richer and more varied than that employed to depict those associated with evaluatively positive stimuli (Peeters, 1971), suggesting that our cognition is perhaps more complex, elaborated, and fine-tuned when it comes to the occurrences of the former (e.g., Czapinski, 1985). Negative differentiation is distinguished by Peeters and his colleagues from the other negativity bias effects under the term *informational negativity* effect, in contrast to the *affective negativity* effect, which includes what we call potency and dominance. Another example of greater negative differentiation, described later, is the generally greater number of negative than positive emotions.

A Possible Additional Aspect of Negativity Bias: Less Adaptation to Negative Events

There are suggestions in the literature, from studies of pain and stress (see, e.g., Taylor, 1991) and adjustment to major good and bad life-events (Brickman, Coates, & Janoff-Bulman, 1978), that there is less adaptation to negative than positive situations. We will not consider this possibility further for two reasons: (a) there is not much evidence to support this claim; and (b)

even if there was evidence, it would be subject to the interpretation that it was a byproduct of negative potency. Careful matching of negative and positive inputs would have to be carried out to establish less adaptation to negative events as independent of negative potency.

A Note on Method

The logic of argument for negativity bias is complex, largely because of the difficulty of equating negative and positive events. At one level, one can compare subjective reactions to objectively equal negative and positive events; this depends on some sort of acceptable scale for events, such as money (losing vs. winning \$100) or temperature. A second approach is to compare combinations of stimuli equated for subjective intensity, or more generally, showing that the outcome evaluation of combined stimuli is more negative than an algebraic sum of subjective (or objective) intensities. A third possibility, depending on the claim, is to show an interaction effect, such that, for example, mixed negative and positive stimuli become more negative the closer one is to them. A fourth way of making a meaningful comparison is to show that a negative event pushes some output into negativity, but a positive event that corresponds in some way to it has no effect in the positive direction. This avoids the scaling problem. A fifth strategy is to show that there is no exact positive equivalent of a given negative construct. For example, Baumeister et al. (in press) argued that there is no apparent positive equivalent to the event of psychic trauma and the associated condition of Post Traumatic Stress Disorder. A sixth approach is to show that, given two logically related but oppositely valenced constructs (e.g., pessimism vs. optimism, bad parenting vs. good parenting), it is the absence or presence of the negative construct that is the principal determinant of an outcome of interest (e.g., recovery), with the positive counterpart making little or no marginal contribution. An example of this strategy at work is afforded by a recent study by Schulz, Bookwala, Knapp, Scheier, and Williamson (1996). Drawing on the prior research, indicating that pessimism and optimism are better viewed as separate factors rather than bipolar opposites, these authors examined separately the effects of dispositional pessimism and dispositional optimism (assessed as responses to four negatively phrased and four positively phrased subscales of Scheier & Carver's, 1985, Life Orientation Test) on survival among 238 patients with advanced cancer. Pessimism was a significant inverse predictor of survival at the 8th month's follow-up for the younger age group (30–59). On the other hand, optimism was not a significant predictor of survival at any age. Baumeister et al., who also cited this and re-

lated evidence, made excellent use of this strategy in their article, illustrating extensively how the absence of the negative matters more than the presence of the positive across a variety of domains, including health, parenting, and relationships. Seventh, less logically sound but often convincing, are findings of a large disparity in effect between a negative and a positive event, as when there is obviously nothing to match the potency on the positive side of a cockroach touching food. All seven of these lines of evidence can be supported by experiments, careful observations, and/or anecdotal reports.

Evidence for Negative Bias in Different Domains

This article is organized in terms of the domains in which negativity bias may occur: sensory, memory, contamination, impressions of persons, moral judgments, and so forth. Superimposed on these domains is our organization of the ways in which negativity bias is manifested. This taxonomy can be fit within the Peeters affective and informational distinction. Some of the areas that we review have received thorough recent reviews, in the context of a negative bias, particularly by Peeters and his colleagues (Lewick, Czapinski, & Peeters, 1992; Peeters, 1971, 1989; Peeters & Czapinski, 1990), Taylor (1991), Cacioppo and his colleagues (Cacioppo & Bernston, 1994; Cacioppo, Gardner, & Bernston, 1997, 1999), and Baumeister and his colleagues (Baumeister et al., in press). In those domains, our review will be less thorough and will cite principally the conclusion of prior reviews.

Physiological Arousal

Taylor (1991) recently reviewed this literature and concluded that there is generally more physiological arousal to negative events and that arousal alone is generally interpreted negatively. She also pointed out that negative stressors (changes) seem to have more of an effect on health than “equivalent” positive “stressors.” As she admitted, the evidence on all of these points is not convincing, because there have been few direct comparisons, and because it is difficult to equate positive and negative events for purposes of comparison. All of the evidence on physiological arousal is directed at the demonstration of negative potency (as opposed to negativity dominance, which involves combinations of negative and positive events). However, Cacioppo et al. (1999) reviewed evidence from evoked potentials in humans suggesting disproportionately negative outputs from combinations of negative and positive inputs (negativity dominance).

Sensation and Perception

As Schopenhauer (1844/1995) noted more than 100 years ago, the absence of pain, unlike pain, has no distinct phenomenological presence:

We feel pain, but not painlessness. ... We feel the desire as we feel hunger and thirst; but as soon as it has been satisfied, it is like the mouthful of food which has been taken, and which ceases to exist for our feelings the moment it is swallowed. (p. 575)

Schopenhauer's (1844/1995) claim is correct for the body interior. With the exception of positive sensations arising in muscles (as in massage), the inside of the body is basically a source of evaluatively negative input. No news is good news, from the point of view of the body interior. The sensations that arise from the body interior are essentially painful indications that all is not well (Rozin, 1999; Troland, 1928). Thus, from the inside point of view, the "positive" state of normal function is the essentially neutral default. Not only does one not go to the doctor when one's organs feel good, but one does not even notice it.

However, the body surface, and especially its apertures, represent both pleasure and pain (Rozin, 1999; Troland, 1928). But even on the body surface, there is a wider distribution of pain. Pain can be produced anywhere on the body surface, whereas the loci for pleasant sensations are far more circumscribed, even named for one set of pleasant sensations: the erogenous zones—there are no labels for "torturogenous zones."

The "we feel pain, but not painlessness" dictum finds its reformulation in Scitovsky's (1974) idea of the phenomenological paleness of comforts, goods that are dedicated to preserving a minimal level of painlessness and that, so to speak, keep pain at bay (e.g., air conditioners). Scitovsky pointed out that we gain little from comforts, because we adapt to them quickly (see also Frederick & Loewenstein, 1999). People generally don't get pleasure from their air conditioning, but would experience immediate discomfort if it ceased to operate.

Negative potency (higher psychological intensity of negative as opposed to positive events) in sensory systems is also exemplified and organized by Troland's (1928) analysis of sensory systems into nociceptive (indicating harm), beneceptive (indicating benefit), and neutroceptive (informational, but innately affectively neutral). The principal neutroceptive systems are vision and audition, but proprioception and pressure and touch are also included. In all of these systems, it is generally true that high levels of stimulation are aversive, but lower levels are often neutral. Troland suggested that the nociceptive and beneceptive systems are reporting on the state of the organism, whereas the neutroceptive systems are re-

porting on the state of the environment. Pain is the principal nociceptive system, but others include the sensations resulting from empty lungs, a full bladder, or certain types of gastrointestinal upset (producing nausea). In each of these cases, there is no obvious beneceptive input that results from normal function. Troland identified the erotic system as the basic positive system. Some systems have nociceptive and beneceptive components, such as taste and smell. In taste, there are more negative (bitter, sour) than positive (sweet) subsystems. Troland noted that decrease in rate of increase of activity in a nociceptive system, or more clearly, cessation of its activity, may lead to positive sensations. Examples he offered include the pleasure of release of discomfort from emptying the bladder or bowels, or from breathing following unpleasant symptoms resulting from oxygen deprivation from the lungs. Indeed, hunger and thirst can be thought of as nociceptive systems; the reduction of either surely produces positive affect, but the systems are basically negative: we only appreciate satiation as a positive sensation at the time that it directly follows a period of hunger or thirst.

The response to stimuli leading to negative evaluations are generally more distinct and intense than those leading to positive evaluations. This is clear in comparing negative and positive facial expressions to tastants in both humans (Steiner, 1979) and rats (Grill & Norgren, 1978).

Although there is substantial adaptation to continued stimulation in most sensory systems, the pain system stands as a notable exception. Pain, as an indicator of something awry, remains an attention-getting input. Furthermore, there is evidence that people adapt more to fragrant than pungent smells (Cometto-Muniz & Cain, 1992).

Attention and Salience

Generally, negative information seems to command more attention. The intellectual issue raised by this small literature is the extent to which negative bias in salience is completely a byproduct of negative potency (greater psychological impact of negative events than equivalent positive events), or whether there are some special negative bias features that operate particularly in the domain of attention. The last study we review (Pratto & John, 1991) controls for potency and still reveals a negative bias effect. The small number of articles that address negative bias in attention focus on the greater ease of identifying negative stimuli, the higher speed of locating negative stimuli in a search task, or the greater masking power of negative stimuli. The stimuli involved are faces, words, and social information.

Masking. Ohnesorg (1999) demonstrated that negative words are more effective as backward masks than positive words. The results also suggested that on repetition as masks, the attention capturing capacity drops faster for positive as opposed to negative words.

Identification. Steiner (1979) studied the judgments by adults of the emotions expressed by infants, presented on videotape, while the infant was experiencing negative (sour or bitter) and positive (sweet) tastes. He reported that adults are better at judging the negative faces. Of course, this suggestive study does not distinguish between the salience of the expressions in the infants or the recognition ability of the participants. Similarly, and with the same proviso, H. J. Grill (personal communication, 1990) reported a greater sense of “urgency” in the Norway rat’s response to negative taste as opposed to positive taste stimuli.

Search. There is one thorough and excellent study in this area, dealing with the search for negative or positive faces in a field (crowd) of other faces (Hansen & Hansen, 1988). The authors reported an “anger superiority effect.” The task is to scan a “crowd” of black-and-white faces of the same person and identify the one face that is discrepant from the others. The discrepant face can be happy or angry, in a background of neutral or opposite valence (angry or happy, respectively) faces. Reaction times are much faster for angry than for happy face targets. Further analysis demonstrates the striking fact that identification of anger faces occurs at about the same time for crowds of four or nine faces, whereas the search for a happy face takes longer with the larger crowd. These results suggest that there is a parallel search for the angry face, a “pop-out” effect, but not for the happy face. The authors proposed that there is a possible preattentive parallel search for signals of direct threat.

Pratto & John (1991) measured reaction times for naming the colors of words in a Stroop test and found that times were longer for undesirable than desirable trait words, suggesting an attention-grabbing power for negative social information. This effect did not appear for negative versus positive nontrait words, occurred when the diagnostic base rate for the negative and positive trait words was controlled, and occurred when the trait words were balanced for extremity (eliminating a simple potency interpretation). The authors reasoned that if attention is selectively diverted by negative traits, then more should be learned about them in an incidental learning situation. On repeating the Stroop study, they found that there is greater free recall of the negative as opposed to positive words after the trial.

Learning

In the domain of learning, we have the opportunity to introduce findings from the animal as well as the human literature. The basic claim is the existence of negative potency and is that negative events, serving as reinforcers, produce learning that is more rapid and more resistant to extinction than learning based on comparable positive reinforcers. The latter claim, about resistance to extinction, has not been tested, to our knowledge. These predictions amount to the claim that learning about negative USs is “prepared,” in the sense defined by Seligman (1970). A third claim is that it should be easier to reverse innate preferences than innate aversions. This entire analysis is subject to the problems raised about comparing negative and positive in the previous section on methodological issues. The problem is particularly strong in this domain because much of the data come from animal research, where there is no accepted way to equate subjective intensity.

Students of animal learning are generally aware that learning with negative events (e.g., escape in the operant framework) is more rapid than learning with positive reinforcers. Perhaps the most striking case is traumatic avoidance learning, which occurs in a single trial, motivated by a single strong electric shock (Solomon & Wynne, 1954). It seems to be generally true, although there is no rigorous test nor systematic comparison in the literature, that escape and punishment are more effective in producing acquisition and resistance to extinction than their positive equivalents, and negative contrast effects may be stronger, on average, than positive contrast effects.

Taste aversions in animals. Conditioned taste aversions, in both animals (reviewed in Garcia, Hankins, & Rusiniak, 1974; Rozin & Kalat, 1971) and humans (Garb & Stunkard, 1974; Logue, Ophir, & Strauss, 1981), typically occur in a single trial. Indeed, conditioned taste aversions are acquired so rapidly, and with such a robust effect, that it has been necessary to reduce the magnitude of the US (often by reducing the potency of the nausea producing procedure) to demonstrate a learning curve. Positive learning in the food domain rarely occurs with such rapidity; Sclafani & Nissenbaum (1988) demonstrated the most rapid learning, sometimes in a single trial, using a particular type of carbohydrate (polycose), and also fat reinforcers. However, overall, there is little doubt in the animal literature about the greater speed and robustness of conditioned taste aversions, as opposed to preferences. Zahorik (1979) attempted a direct comparison and confirmed this relation, although her study was not able to accomplish a convincing demonstration that the nega-

tive and positive reinforcers were equated, in some reasonable sense.

The negative bias hypothesis is strongly supported in studies that attempt to reverse innate preferences or aversions. The standard one-trial-effective taste aversion paradigm uses sugar or saccharine solutions, for which there is an innate preference. On the contrary, extended efforts to reverse innate aversions to bitter or irritant sensations in animals, over many trials and months, have generally failed almost completely (Rozin, Gruss, & Berk, 1979; Warren & Pfaffman, 1959). Exceptions are one study with rats using social mediation (conspecific consuming an irritant diet), which led to a modest preference for a mildly irritating diet (Galef, 1989); one study showing a very gradual development of a preference for piquant crackers by captive chimpanzees, in a situation of extended social interaction with humans (Rozin & Kennel, 1983); and one case of a dog that gradually developed a preference for piquant foods, in a social and home environment (Rozin & Kennel, 1983). Although humans regularly and gradually develop preferences for many innately unpalatable foods such as chili pepper, ginger, raw garlic, coffee, and alcohol, there are practically no cases on record of spontaneous development of such preferences in animals. To the contrary, animals that regularly consume spicy Mexican food (as garbage) in a rural Mexican setting do not develop a preference for chili pepper, whereas all the surrounding adults over the age of about 5 do (Rozin & Kennel, 1983; Rozin & Schiller, 1980).

Taste aversions, phobias, and fetishes or passions in humans. The usually one-trial, robust, taste-aversion phenomenon has been well documented in humans, primarily by retrospective questionnaire (Garb & Stunkard, 1974; Logue et al., 1981; Pelchat & Rozin, 1982), and it appears that nausea is the critical unconditioned stimulus that produces the effect (Pelchat & Rozin, 1982). Conditioned taste aversions have also been produced in humans under controlled conditions (e.g., Bernstein, 1978).

Phobias represent yet another area in which there is strong, retrospective evidence for rapid one-trial negative learning. Single traumatic incidents with dogs and other animals, in particular, seem sufficient to produce strong negative responses (Solomon & Wynne, 1954). Seligman (1970, 1971) used conditioned taste aversions and phobias as prime examples of what he called “prepared” learning. However, there is no well-documented opposite effect of very rapid and robust positive learning in humans. Humans come to develop strong likes for many things, including foods, music, and pets. In all of these, so far as we know, the acquisition process is much slower than for taste aversions or

phobias. (However, there is no evidence that these strong likes are less resistant to extinction than are phobias or conditioned taste aversions.)

Humans may be unique, among animals, in the development of strong and enduring likes (Rozin, 1982). These are abundant and include the robust reversal of innate aversions, as in the development of strong preferences for chili pepper, coffee, horror movies, tragic drama, and scary rides at amusement parks (McCauley, 1998; Rozin, 1990). It is possible that this perhaps unique human feature is an adaptation to culture, which requires adherence to, and preferably a desire for, a whole set of cultural values (Rozin, 1982). However, whatever the reason for this, these strong positive attachments develop gradually.

The opposite of a taste aversion or a phobia would be what we call a fetish, or more generally, a passion. Passions exist on a grand scale in humans, especially in the first world, where there is leisure time that would allow for such activities. Passions, which we will define as strong liking for things or activities that have no obvious biological function, become a major part of one’s life and a major source of pleasure. Passions include activities such as collecting stamps or bottle or hub caps, horse or automobile racing, and sports fandom (Wrzesniewski, Rozin, & Bennett, in press). These passions challenge any straightforward adaptive account and are, in a sense, a challenge as well to the principle of negativity bias. Although there has been no experimental research in this area (except for sexual fetishes, see Rachman & Hodgson, 1968), there is no reason to believe that passions are rapidly acquired, although they often are highly resistant to extinction.

Evaluative conditioning. Other than mere exposure, evaluative conditioning is the only account for the acquisition of likes and dislikes with both a theoretical basis and abundant supporting laboratory experiments. In evaluative conditioning in humans, a positive or negative US (e.g., an unpleasant or pleasant picture, face, or taste) is contingently paired with a relatively neutral CS. After a number of trials, the participant’s evaluation of the CS moves in the direction of the US (Martin & Levey, 1978). The initial investigators of this type of conditioning, Levey and Martin (1975), concluded that “The effect of negative evaluation was clearly stronger than that for positive evaluation, and this is consistent with our knowledge of aversive conditioning” (p. 224). Subsequent studies of evaluative conditioning, most prominently by a group of Belgian investigators led by Frank Baeyens (e.g., Baeyens, Crombez, Van den Bergh, & Eelen, 1988), are consistent with this result, although no direct tests of the negative bias hypothesis have been made. The Baeyens group initially used positive and negative faces as unconditioned stimuli,

roughly balanced for valence by subject ratings. The results supported slightly larger conditioned effects for the negative stimuli. More recently, the Baeyens group has shifted to a different paradigm, based on pairing of flavors with pleasant or unpleasant tastes (Baeyens, Eelen, Van den Bergh, & Crombez, 1990). This paradigm was based on a positive finding for pairing of sweet tastes with neutral flavors (Zellner, Rozin, Aron, & Kulish, 1983). However, the Baeyens group found the positive pairing to produce only marginal effects, whereas pairing with a negative taste produced more robust effects (Baeyens et al., 1990).

Both conditioned taste aversions and acquired phobias fit within the paradigm of evaluative conditioning. Both, as previously mentioned, show a substantial negativity bias.

Motivation—Gradient Steepness

This minimally investigated area provides the only direct evidence for one of the four manifestations of negativity bias, the steeper approach gradients for negative as opposed to positive stimuli. The basic finding is that as one approaches a negative entity, in either time or space, the aversion for that entity or experience increases more steeply than the increase in attraction does for approach to a positive entity (N. E. Miller, 1944). Note that this relation does not depend as much on careful balancing of the negative and positive entities as do the potency studies because the finding of interest is an interaction effect.

The evidence for this potentially basic feature of animal and human motivation is summarized by N. E. Miller (1944). The most convincing study was carried out by Brown (1948). Brown measured the rat's tendency to pull toward a reward (food) at the end of an alley, at different points in the alley; he did the same for the tendency to pull away from a negative event (shock) at different points in the alley. He reported steeper negative than positive gradients in terms of distance from site of feeding or shock. This was confirmed at two different levels of motivation (amount of food deprivation or intensity of shock). In Brown's design, temporal and spatial closeness are confounded. Although it is likely that the gradient phenomenon holds for time or space alone, this has not yet been demonstrated.

Another type of demonstration of the gradient effect would be to show that for events (or roughly simultaneous combinations of events) of mixed positive and negative characteristics, the net response to these events becomes more negative the closer one is to them (in space or time). We have recently (Rozin, Kurzer, & Royzman, 2000) demonstrated this with human participants, who rated their net evaluative response to a neg-

ative and positive event scheduled to occur on the same day, from the vantage point of 1 month ahead versus tomorrow. For tomorrow, the event combination was rated as more negative.

N. E. Miller (1944) offered an account of the steeper negative gradient in terms of the source of motivation. He pointed out that electric shock is an external event, such that closeness to its source should reasonably increase intensity of response. For food, however, there is an underlying motivation of hunger, which presumably does not vary much as one approaches the goal object. In other words, insofar as negative motivations are more externalized, closeness should be a more powerful dimension in the negative case. Miller also noted that the gradient steepness is separable from the gradient height and referred to studies (including the work of Brown) that indicated that overall strength of motivation affects the height but not the slope of the gradient function.

In addition to N. E. Miller's (1944) external versus internal motivation account, there are two possible, not mutually exclusive, accounts of gradient effects. According to the intensity account, some aspect of the preevaluative representation of the relevant stimuli shows a negative enhancement effect. There is at best suggestive evidence from taste that intensity of bitter (measured by physiological response) rises more steeply than for sweet (Pfaffman, 1960), and it seems to us quite reasonable that this would also hold true for pain or pleasure from the body surface. Because we can presume that getting closer in time or space to a stimulus increases the intensity of its representation, this intensity negative bias effect could account for gradient effects. However, one could also argue that, given the urgency of negative inputs, the input might rise to a maximum very rapidly, so that gradient effects might only occur over a small range of time or space. There are suggestions of a steeper function relating negative entities to affective negativity in the contagion literature. The phenomenon of dose insensitivity, documented principally for negative contagion, indicates that very small doses of contact with negative entities (e.g., germs, contact with an undesirable other person) produce almost the maximal effect (e.g., Rozin & Nemeroff, 1990; Rozin, Markwith, & Nemeroff, 1992).

The negative gradient effect might also result from an asymmetry later in the processing system. In the face of equal recruitment of intensity with closeness, it is possible that the function relating subjective intensity to evaluation is what is more steep for negative than for positive stimuli. We know of no direct evidence on this relation. In either event, it is important to realize, as Cacioppo and his colleagues have indicated (Cacioppo & Bernston, 1994; Cacioppo, Gardner, & Bernston, 1997, 1999), that although the slope is steeper for negative events, at low levels, the absolute

value of positive affect is higher than is negative affect (“positivity offset”).

Mood

Taylor (1991), on reviewing asymmetrical effects of negative and positive events, concluded that expectations of negative events are the strongest determinants of mood. Insofar as negative events have been equated with positive events, she suggested that negative effects still have a bigger effect on mood.

Memory

For fine ideas vanish fast, While all the gross and filthy last. (W. I. Miller, 1997, p. 70 [Strephon and Chloe vv 233–234, Poetical Works, 525])

The evil that men do lives after them; the good is oft interr’d with their bones. (Shakespeare, quoted in Greenblatt, 1997, p. 1565)

These quotes notwithstanding, the existence of a negativity bias (negative potency) in memory is controversial. Baumeister et al. (in press), in their review of the memory literature, concluded in favor of the existence of a negative bias in memory, at least for certain types of information. On the other hand, Taylor (1991) and Matlin and Stang (1978) argued for greater potency of positive memories. Our own consideration of the literature inclines us to support a positivity bias view in memory.

The widespread operation of negativity bias might be expected to generalize to selective memory for negative experiences. This prediction might be strengthened by the greater attentional salience of negative events (reviewed earlier) and abundant evidence for deeper processing of negative events (reviewed in Baumeister et al., in press). Although there are some striking examples of predominance of negative bias in recall, notably of early childhood memories (Blonskii, 1935/1994; Kreitler & Kreitler, 1968), in our view the preponderance of evidence suggests a positivity bias in this domain. The most thorough treatment is in a chapter reviewing this very issue in a book devoted to demonstrating a general positivity bias (Polyanna Principle) by Matlin and Stang (1978). Well over 100 findings, from various paradigms, show a positivity bias in a majority of cases. Matlin and Stang considered three accounts for this: advantages in short-term memory, selective rehearsal, or compensatory processes in long-term memory, and find evidence for each. Most impressive is their multiple regression analysis of 14 variables on degree of positivity bias. A

major effect is reported for delay of recall, such that longer delays lead to more positive bias. Taylor (1991), in a review, came to a similar conclusion as Matlin and Stang and focused her account on compensatory responses that minimize negative memories, which occur gradually over time (accounting for the increased positivity bias with delay). Thus, on Taylor’s reasonable view (consistent with Matlin and Stang), the major reason for positivity bias is not that negative events are inherently less memorable, but rather that they are neutralized over time.

Results on both autobiographical memory and laboratory studies suggest that over modest to long intervals of recall, there is a positivity bias in memory. The question remains as to whether this bias directly contradicts the principle of negativity bias. There are two processes that may be at work in these studies to enhance the appearance of a positivity bias. There is abundant evidence that positive events are much more frequent than negative events; hence, in an autobiographical recall study, one would expect more positive events. This is a substantial bias, but it has been eliminated as a total account by a number of studies in which participant’s recall was checked against diary records of positive and negative experiences that they were asked to keep (Holmes, 1970; reviewed in Matlin & Stang, 1978).

The second “bias” in recall is the very compensatory processes that are aptly described by Taylor (1991). Work is done to reduce the salience of negative events in memory. We are inclined to believe that Taylor identified the major reason for a positivity bias in recall and that the mechanisms she invokes themselves testify to the salience of negative events.

Contagion

The domain of contagion offers what are perhaps the most striking instances of negativity bias. It is partly for this reason that the striking examples we introduced at the beginning of this article are about contamination. The negativity bias in contagion is evidenced in the terminology alone: Negative contagion is represented in the word “contamination” in English. There is no obvious opposite term for positive contamination (purified has a much more general meaning and does not imply minimal contact, as does contamination).

The law of contagion was put forward as one of the laws of sympathetic magic by three anthropologists around the turn of the century (Frazer, 1890/1922; Mauss, 1902/1972; Tylor, 1871/1974). The basic idea is that when entities contact, “essence” passes between them and leaves a permanent trace (“once in contact, always in contact”; reviewed in Rozin & Nemeroff, 1990; Nemeroff & Rozin, 2000). Minimal contact is all

that is necessary to allow for the passage of essence. The early anthropologists saw contagion as a belief of “primitive” peoples, but it is now clear that it is universal (Rozin, Millman, & Nemeroff, 1986). Common examples for Americans include reluctance to consume foods briefly contacted by worms or cockroaches or to wear clothing that had previously been worn by a disliked person.

Negativity bias in the potency domain is intuitively clear for Americans and has been demonstrated in the laboratory (Rozin et al., 1986; Rozin, Nemeroff, Wane, & Sherrod, 1989). In particular, disliked people produce a larger contagion effect than do liked people. In addition, as indicated in the introduction, in the food domain, there is nothing nearly as potent on the positive side as a cockroach or an earthworm on the negative side.

Negativity bias in potency is also illustrated in the Hindu caste system, where contact with lower castes produces much more contagion than does contact with higher castes. Among the Hua of New Guinea (Meigs, 1984), perhaps the most contagion sensitive of all cultures studied, there is abundant positive contagion, but negative contagion remains more powerful.

There is relatively little data on dominance effects (greater effects of contaminants as opposed to purifiers, over and above their rated potency). We have some unpublished data (Rozin & Royzman, 2000) that indicates that combinations of negative and positive contagion (e.g., a sweater worn by a disliked and then a liked person, or vice versa) is rated more negative than the algebraic sum of the subjective evaluative ratings of each sweater separately.

It is notable that contagion is both a domain of manifestation of negativity bias and a theory for why it occurs. That is, in general, negative events may have more penetrance or contagiousness than positive events.

Asymmetric weighting and racial purity. Certain practices of designating a racial underclass in relation to its ancestral roots proffer another compelling (and politically consequential) example of negativity bias at its bluntest. In the words of Neil Gotanda (cited in Lopez, 1996), “The metaphor [for defining a racial underclass] is one of purity and contamination: White is unblemished and pure, so one drop of ancestral Black blood renders one Black. Black is a contaminant that overwhelms white ancestry” (p. 27). Of particular interest, from this perspective, is the notorious “one drop of blood” rule of racial categorization, having its formal origins in provisions of the Code Noir (the “Negro Code”) of 1685, designed, in part, to safeguard the “purity” of the White race by eliminating “tainted” blood (the rule enjoyed considerable vogue in certain parts of postcolonial America, e.g., Alabama, Arkansas). The

rule is that “any known African ancestry renders one Black” (Lopez, 1996, p. 27). As Lopez pointed out, in accordance with this rule, “no ‘mixed-race’ applicant was naturalized as White” (p. 27). There exists no historical evidence for the positive equivalent of a “one-drop” ordinance—that is, a statute whereby one’s membership in a racially privileged class would be assured by one’s being in possession of “one drop” of the racially superior blood (a situation of some bearing here is the determination, often for purposes of marriage or succession, as to whether a person is of a “royal” line; certainly, in this case, the royal blood can represent less than half of the total “blood,” but we know of nothing like a one-drop rule).

The Nuremburg laws, promulgated by the Nazis in the 1930s to define and persecute Jews, forced a definition for Jewishness. The one-drop rule here would have been impossible to enforce; instead, the rule was that one Jewish grandparent was sufficient for the designation as Jewish. It is interesting in this regard that in the affirmative action debate in the United States, where previously stigmatized and contaminating groups, especially Blacks, are now given preference, nothing like a one-drop rule has been instituted. It is rather general resemblance and associations with members of the previously stigmatized groups that makes one eligible for privileged treatments. Thus, when “Black was bad,” a one-drop rule justified inclusion in the category, but a much more substantial link is required for Black status now that, in some contexts, “Black is good.”

Decision Making

Loss aversion, one of the most fundamental and well-documented biases in information processing, is a quintessential illustration of negativity bias in the form of potency. The principle of loss aversion, based on the prospect function, holds that losses are more negative than corresponding gains are positive (Kahneman & Tversky, 1979; Tversky & Kahneman, 1991). In its boldest form, losing \$10 is worse than winning \$10 is good. Although we are convinced of the general validity of loss aversion, and the prospect function that describes and predicts it, we confess that the phenomenon is only realizable in some frameworks. In particular, strict loss and gain of money does not reliably demonstrate loss aversion (unpublished data by the authors). Perhaps the most robust demonstration of loss aversion is in the endowment effect (Kahneman et al., 1990), in which the loss is framed as loss of a “possession” and the gain as acquisition of the same possession. Under these circumstances, in a number of cases, the loss of a possession, literally just given at random to the participant, is valued at somewhere around twice

the monetary value as the gain of the same possession by someone who does not currently possess it.

A general limitation of one class of loss aversion studies is that they require an objective metric of value, almost always money, against which to measure subjective value. Money is a nicely scaled objective value, but it may have some special properties that compromise it as a metric. In particular, it may reduce loss aversion effects by virtue of its fungibility and promote a “rational” mode of thinking (Rozin, Grant, Weinberg, & Parker, 1999).

The endowment effect allows one route around money, because it involves loss or gain of the same entity, and hence one can presume the objective value is equal in either case. Framing is another route around the money metric; the same objective transaction can be framed as either a gain or a loss. Thus, it is reported that people are more inclined to use credit cards when the alternative is described as a discount for cash (a gain) rather than a surcharge for use of the credit card (a loss).

There is a second heuristic that can be seen to be derivative from loss aversion. This is the principle that there is risk aversion for gains and risk seeking for losses. This bias can be derived from the idea that a certain loss is particularly undesirable (loss aversion) and hence encourages risk taking. Some of the more robust findings in the study of heuristics and biases demonstrate the risk seeking for losses phenomenon. For example, people are much more likely to take risks to avoid the certain loss of 400 out of 600 lives than they are to take risks in the face of saving 200 of 600 lives.

There is very little data on negativity dominance in the loss aversion literature. This is undoubtedly because the prospect function does not predict negativity dominance. That is, once one has subjectively equated losses and gains, there is no reason to predict that the combined outcome would be negative. Note that, although the bulk of data on loss aversion comes from between-subject designs (which avoid presentation of the “bald” facts to the participant), dominance studies require the direct comparison. In our experience, asking participants to judge the net hedonic value of losing and gaining \$100, or losing and finding a possession, leads to surprise and, for most participants, the obvious response of “zero.” This can be avoided by using previously equated different entities, such as a food rated +4 and a musical selection rated -4 on an hedonic scale. Another alternative is to simply combine negative and positive events with previous subjective ratings and show that the overall hedonic valuation is more negative than the averaged evaluation of the components. We have collected some data suggesting such a negative dominance effect, using foods previously contacted in

preparation by, or sweaters worn by, both desirable and undesirable people (Rozin & Royzman, 2000).

We also gathered informal data suggesting that people regard pains as more real than pleasures of equal intensity. College students ($n = 14$) were asked to imagine that they had before them a little red button that, if pressed, would give 1 min of intense pain to one individual and (Version A) 10 min of similarly intense pleasure to another individual or (Version B) 1 min of similarly intense pleasure to 10 individuals. All of the participants declined “to purchase” pain with pleasure under either scenario. When the students were asked to put some number instead of 10 that would make them change their mind, the lowest number was 800 for Version A. Under Version B, all except one student said that no number would suffice.

Development

There are no compelling predictions that the negativity bias hypothesis makes about development, other than the occurrence of the various manifestations of negativity bias features demonstrated in adults. Very few of these have been probed or demonstrated in children.

However, there is a feature of human development that is supportive of the negative bias position. Bridges (1932) observed infants in the 0- to 2-year-old range, rating behavior in terms of the presence of various emotions. The earliest expressions, in the first months of life, are general excitation and distress, with no clear positive expressions. Anger, disgust, and fear appear around 6 months of age. A positive expression (“delight”) was apparent at 3 months, somewhat after distress appeared, but no other positive expression or actions appeared until 12 months, when elation and affection are reported. Little information is provided about the criteria for these designations, so this study must be taken only as suggestive, but the point is surely worth exploring.

As mentioned earlier, Steiner (1979) reported that, when adults judge emotions of videotaped infant faces, they show better performance with responses to bitter and general aversion than they do with positive faces (induced by sugar in the mouth).

Impression Formation

It is in the domain of impressions of persons that negative bias has its longest and fullest history in psychology. The explicit references to the process of negativity bias (Fiske, 1980; Kanouse & Hanson, 1972; Lewick et al., 1992; Peeters, 1971) have centered on the impressions phenomena, and negativity bias theories in psychology also center in this area.

There have been thorough reviews of negative bias in impressions (Baumeister et al., in press; Fiske, 1980; Skowronski & Carlston, 1989), so we will limit our discussion here.

The core and paradigm setting study in this area is Asch's (1946) classic study. Asch employed lists of terms describing people, using a between-subject design and typically varying only one feature of a description (presence or absence of a trait, or change in ordering) between groups. Asch, himself, did not explore negativity bias, but he did promote the idea that the total impression, and its valence, was not the algebraic sum of its components. This study, both conceptually and methodologically, gave birth to an enormous literature on impressions of persons. With respect to our theme, almost all of these studies involve the combination of negative and positive traits and hence fall under the rubric of negativity dominance.

A robust negative bias in impressions studies has been consistently demonstrated, dating from Jordan (1965) and Kanouse and Hanson (1972); the early work is well reviewed by Fiske (1980). These and other findings encouraged a variety of theoretical accounts. Kanouse and Hanson introduced the lower frequency of negative events and their consequent greater extremity (from the positive baseline that results from their lower frequency). Skowronski and Carlston (1989) offered a comprehensive review of theories and proposed a category diagnosticity theory. They emphasized the extent to which a characteristic is diagnostic of the category in question, which is to say, a feature of most or all members of the category and as few nonmembers as possible (a perfect discriminator, like the placenta for mammals, having a diagnosticity of 1.0). The claim is that highly diagnostic characteristics will be more heavily weighted in impressions and that, generally, extreme and negative behaviors are more diagnostic. Although frequency and diagnosticity may often covary, they can be separated.

Frequency and diagnosticity theories both predict a positive bias in cases where the positive trait is rarer. Skowronski and Carlston (1992) demonstrated this effect, showing that dishonesty (more diagnostic than honesty) dominates honesty, whereas high intelligence (more diagnostic than stupidity or low intelligence) dominates stupidity. A person who behaves highly intelligently on one occasion, and stupidly on three occasions, is still seen as intelligent.

Fiske (1980) and Wojciszke, Brycz, and Borekna (1993) implicated extremity of a trait as another potent influence and as a moderator of the negativity bias effect. Negativity bias effects appear much more clearly when extreme traits, both positive and negative, are included as instances. This result harkens back to the steeper negative gradient phenomenon, referred to in the taxonomy and discussed later.

More recently, Lupfer, Weeks, and Dupuis (2000) noted that almost all of the evidence for negativity bias in impressions comes from situations in which both negative and positive traits or behaviors are attributed to the target person. They demonstrated an absence of negativity bias in comparisons of all positive attributes versus all negative attributes impressions. This important study has particular significance for the taxonomy that we have presented, because it puts the negativity bias in impressions phenomena squarely in the domain of negativity dominance, rather than negative potency.

Empathy

Empathy is a nominally neutral term. According to definition, it is a psychological process that "involves sharing the perceived emotion of another—'feeling with' another" (Eisenberg & Strayer, 1987, p. 5), "an affective response that is more appropriate to the other's situation than to one's own" (Hoffman, 1987, p. 53), or "a cognitive awareness and understanding of the emotions and feelings of another person" (*Reber's Dictionary of Psychology*, 1991, p. 238). However, empathy is far more commonly used in the negative sense, as an indication of one's compassion, sympathy, or pity. Ironically, the very same authors (e.g., Eisenberg, Hoffman) who define empathy with no regard for valence give exclusively negative instantiations of the phenomenon and experimental models of empathy-elicitation and development (e.g., Batson & Coke, 1981; Hoffman, 1987) analyze it in predominantly negative contexts.

Thus, there appears to be a glaring disparity between what Kenny (1963) would consider the "formal object" (p. 189) of empathy (any emotional experience of another sentient being) and its particular empirical referent (another's negative state, e.g., physical suffering, grief, fear, disappointment). Expressions of empathic joy are somewhat unusual. Thus, if A tells me, "I just got engaged," it would be odd, if not downright uncouth on my part, to reply, "You have my empathy" precisely because of the implication that I view A's engagement as some kind of adversity. On the other hand, on the purely linguistic level, we find that (a) there is no term in English and at least a number of other languages that specifically denotes "feeling well (with or for) at the sight another's happiness," (b) there are numerous terms that specifically denote a vicarious affective response to another's distress (the English pity, sympathy, compassion; in Russian—*sostrodanie* [cosuffering] and *soboleznovanie* [feeling another's pain]), and (c) the supposedly generic terms, like empathy or the Russian *sochustvie* (feeling what another feels), are, in practice, synonymous with the terms that signify our affinity with another's negative state (see Rozin & Kumar, 2001).

The apparent preponderance of negative over positive empathy is not restricted to the world of human adults. As Thompson (1987) commented in one of the few passages in the psychological literature that deal specifically with the positive–negative empathy asymmetry,

There is reason to believe ... that adults as well as young children are more likely to respond empathetically to salient expressions of negative emotions in others. The hypothesized functions of empathic arousal in human adaptation enlist empathy primarily in response to others' distress cues. Similarly, from the ethological perspective, human infants are thought to be highly sensitive to social cues that are relevant to protection from threat, and this is more likely to entail distress signals. (p. 139)

Rousseau (1762/1950) was so thoroughly imbued with the practical aspect of this insight that he made it one of the (less known) cornerstones of his pedagogical system:

First Maxim: It is not in the human heart to put ourselves in the place of those who are happier than ourselves, but only in the place of those who are most to be pitied. From this it follows that to incline a young man to humanity, instead of making him admire the brilliant fate of others you must show him the sad sides of things and make him fear them. (pp. 184–185)

To reiterate, although the “standard” definitions of empathy stated at the beginning of this discussion envision an empathic experience as something unvalenced, in actuality, the empathic reaction appears to be principally to a narrowly defined set of highly negative affects—for example, fear, grief, disappointment, and so forth. It seems to be more difficult to be “contaminated” by, and react empathetically to, another's euphoria or pride. The putative higher contagion of misery than joy seems to be the reason why literary art is so heavily geared toward the depiction of suffering (because aesthetic contagion utilizes our more general empathic mechanisms) and prosocial behavior is generally understood as alleviating other people's distress rather than maximizing other people's joy.

Another asymmetry in empathy has to do with the targets of empathy. Instances of positive empathy are disproportionately directed at individuals close to the target person, whereas instances of negative empathy extend broadly to people all over the world.

There is an adaptive account of the preponderance of negative empathy. The experience of negative empathy is likely to motivate specific helping behaviors that, at least for related others, would be beneficial. On the other hand, there is little in the way of response that is warranted by the good fortune of others.

Moral Judgments

Whatever the theoretical account (and the frequency or diagnostic account seems quite appropriate here), the enormous negativity bias in judgments of character is striking. The literature on morality in psychology (and philosophy; see Kupperman, 1991) is highly biased to analysis and experimentation with scenarios involving a single moral judgment or offense. These form, in many ways, the most tractable basis for analysis and experimentation. However, this emphasis has slighted the study of moral trajectories, or character (Kupperman, 1991). It is in character, or net worth, as it were, that the phenomena of negativity dominance in morality play out, and it is thus in the person perception literature, rather than the morality literature, that we find relevant studies.

Rather extreme immoral acts have an almost indelible effect; for many people they are unforgivable. This fact has been noted widely; we offer here two literary sources:

So, oft it chanceth in particular men,
That for some vicious mole of nature in them,
As, in their birth—wherein they are not guilty,
Since nature cannot choose his origin—
By the o'ergrowth of some complexion,
Oft breaking down the pales and forts of reason,
Or by some habit that too much o'er-leavens
The form of plausible manners, that these men,
Carrying, I say, the stamp of one defect,
Being nature's livery, or fortune's star,—
Their virtues else—be they as pure as grace,
As infinite as man may undergo—
Shall in the general censure take corruption
From that particular fault: the dram of eale
Doth all the noble substance of a doubt
To his own scandal.
(Shakespeare, quoted in Greenblatt, 1997, *Hamlet*, Act I, Scene 4, p. 1682)

Consider also the notion of “the tragic flaw,” typically a single failing in an otherwise admirable character, that brings about the ruin of the character in classic Greek drama and later drama as well:

Oh! I can feel it now: nought can soothe
us midst our worldly cares, but the conscience!

But if, through chance, it's scarred, by but a single
stain, ... a single stain ... then woe and misery!
As from a deadly sore, the soul then burns, the heart is
drenched in venom, and reprove, as if some pealing
hammer, fills the ears.
One's sick all over, and the head is whirling,
and bloody lads appear before the eyes ... And one
would flee, save one can find no shelter ... agony!
He is wretched most whose conscience is unclean.
(Pushkin, 1825/1978, Boris Godunov, p. 219)

Consider also the slip of the tongue, or single questionable action (re Gary Hart's admission of one indiscretion) that ruins a promising career. With reference to status in street gangs, Anderson (1984) noted that "In street culture, especially among young people, respect is viewed as almost an external entity that is hard-won but easily lost, and so must constantly be guarded" (p. 82). The fragility of moral purity in the Hindu system is yet another example—hard to attain and maintain, easy to lose by a single polluting act.

It seems to us that frequency and diagnostic accounts, although clearly relevant and with some explanatory power, are not able, on their own, to account for the negativity bias in moral judgment. After all, heroic acts are surely as infrequent and diagnostic as immoral acts, yet murder is rarely balanced, in the judgment of people, by a single heroic act. In a recent survey with a few hundred introductory psychology undergraduates, we asked how many lives a person would have to save, each on individual occasions and each at risk to his or her own life, to be forgiven for the murder of one person. The median was 25 (Kurzer, Rozin, & Royzman, 2000).

When we shift the focus from moral incidents to moral trajectories—that is, to character—we almost invariably place ourselves in the framework of negativity dominance because most lives are a mixture of morally admirable and questionable acts. It is possible, referring back to Lupfer et al. (2000), that there would not be a negative bias in the comparison of morally exemplary and totally immoral characters.

Negativity Dominance and Cognitive Distortions

One of the fundamental tenets of the cognitive model of depression (A. T. Beck, 1976) is that individuals suffering from this disorder exhibit a systematic negative bias in the processing of complex valenced information (i.e., the information that has both positive and negative characteristics). This tendency leads them to pay inordinate attention to the negative aspects of a situation, an object, or a person, while assiduously ignoring or discounting the object's positive aspects or attributes. This pathological tendency (which expresses itself in a variety of processing errors or "cognitive distortions," including the *disqualifying the positive* distortion, the *magnification or minimization* distortion, the *mental filter* distortion, and the *tunnel vision* distortion; J. S. Beck, 1995) bears a striking resemblance to what we discussed earlier as the synchronic subtype of negativity dominance, the principle of evaluation positing that "the holistic perception/appraisal of integrated negative and positive events (or objects, individuals,

hedonic episodes, personality traits, etc.) is more negative than the algebraic sum of the subjective valences of those individual entities." We speculate that these cognitive distortions represent an abnormally amplified, persistent, self-regarding version of the penchant for negativity dominance that is part of a normal evaluative response. If this conjecture is correct, one may predict that subclinical individual differences in negativity bias will be an index of a person's potential for depressive ideation.

Negative Differentiation

There is substantial evidence suggesting that responses to negative events are more differentiated and complex. The organism probably has more appraisal to do on negative events, because the response options are more varied (fight, flight, slow withdrawal, or freezing), as opposed to the straightforward approach response to positive events. The evidence that is relevant (some of it reviewed in Peeters & Czapinski, 1990, and Taylor, 1991), falls into three categories, which we will consider in turn.

Negative events elicit more attributional activity.

Negative events elicit more causal attribution than positive events (Bohner, Bless, Schwarz, & Strack, 1988) and are perceived as more complex (documented and reviewed in Peeters & Czapinski, 1990). Across cultures, people seem to seek more explanations for negative than positive events (A. Fiske, personal communication).

Roese and Olson (1997), following on norm theory (Kahneman & Miller, 1986), demonstrated that counterfactual thinking, a form of concern about and replaying a past outcome, is more likely in the context of negative events and negative emotions. People seem to be particularly motivated to undo past unpleasantness. Kahneman and Miller (1986) also noted that the "affective response to an event is enhanced if its causes are abnormal" (p. 145). Because negative events are rarer, they may fall under this account, as being more abnormal. Baumeister et al. (in press) considered this feature of negativity bias in much more detail.

Language: Greater cognitive elaboration of negative events. The vocabulary used to describe the qualities of physical pain is far richer and more varied than that employed to depict the qualia associated with physical pleasure, suggesting that our cognition is more complex, elaborated, and fine-tuned when it co-

mes to the occurrences of the former. This is our list of pain and pleasure descriptors:

Pain (31 words): deep, intense, drilling, boring, dull, sharp, aching, burning, cutting, pinching, piercing, tearing, twitching, shooting, raking, gnawing, itching, stabbing, nipping, sticking, thrusting, hard, throbbing, (dragging), penetrating, lingering, fitful, radiating, (breathtaking), bitter, pricking, (vicious), (monotonous), biting, incising.

Pleasure (14 words; partly based on a review of erotic literature): intense, thrilling, sharp, delicious, exquisite, deep, fluttering, lingering, radiating, sumptuous, breathtaking, electrifying, delicate, sweet.

The substantially greater (350 msec) reaction time in matching a negative adjective to the designation negative, as opposed to a positive adjective to the designation positive, is most easily interpreted as more complex or deeper processing of the negative, although there are other accounts, such as simply reversing a natural tendency (Osgood & Hoosain, 1983).

Emotions: Greater number of categories and response options on the negative side. “All happy families resemble one another; every unhappy family is miserable in its own way” (Tolstoy, 1875/1998, p. 1). The elicitors of negative emotions are conceptually more varied, and there are more response outcomes that are appropriate for negative elicitors. (On the contrary, it is probably true that there is more between-individual variation in what elicits positive affect, as opposed to negative affect; the elicitors of the latter, although highly varied, tend to be more similar across people. The idiosyncratic nature of most pleasures is precisely what makes their induction so difficult in a laboratory and makes public policy directed at improving pleasures somewhat problematic.) The multiplicity of responses implies a more complex processing system, at least at the final stages before output. Because emotions are often interpreted as action tendencies, the wider range of potential responses to negative events links directly to the observation of a larger number of negative than positive emotions. None of this escaped the founder of experimental psychology, Wilhelm Wundt (1896), who wrote the following:

Obviously language has produced a much greater variety of names for unpleasant emotions than for pleasurable. In fact, observation renders it probable that unpleasurable emotions exhibit a greater variety of

typical forms of occurrence, and that their different forms are really more numerous. (p. 180)

Similarly, Titchener (1908) noted in his introductory text that “... language has but few words to express pleasurable emotions” because of more varied “bodily manifestations of unpleasant emotions” (p. 243).

Carlson (1966) reviewed emotion terms in 172 introductory texts, published over the period from 1877 to 1960. He recorded 20 pleasant emotion terms, and 30 unpleasant emotion terms, and reported that 74.8% of the pages in the emotion chapters referred to negative emotions. Furthermore, when students were asked to name emotion terms, 35.2% were positive and 61% were negative. Averill (1980) as well reported fewer positive emotions from nonverbal indicators and reported that 62% of a large number of adjective emotion terms were rated as negative. He also reported a weak tendency for positive emotional words to be used more.

There is a larger number of “basic” negative emotions as opposed to “basic” positive emotions, a point noted by Izard (1971). We present here a list of the major taxonomies of emotion (Table 1), all of Western origin except that from the ancient Hindu texts, the *Natyashastra* (Hejmadi, 1999). Unlike all other taxonomies, the Hindu list has equal numbers of positive and negative emotions. This difference is surely worth exploring and may have something to do with the fact that this is the only taxonomy that comes from a “collectivist” society.

The most straightforward account of the thrust of the results described is that the greater set of response options in the negative domain promotes a more differentiated set of emotional expressions because their contact should signal appropriate action to conspecifics. On the other hand, Averill (1980) suggested an interesting additional influence. Emotion implies a sense of diminished responsibility (at least in English), and this frame discourages classification of positive acts as produced by emotion. People are rarely described as overcome by charity.

Language: A negativity bias in lexicalization of negative events. There are a number of common-usage one-word terms with negative connotations whose positive opposites, although conceptually conceivable, simply do not have any simple, one-word linguistic representation. Consider, for example, “risk” as it is commonly used in law or medicine (in the sense of a future outcome that is both negative and uncertain, i.e., “bad chance”). Opportunity apparently does not qualify as an opposite. One would be hard-pressed to say (at least in English), “he has a 50% opportunity of walking again.” Apparently there is no single unambiguous word for “a chance of some propitious occur-

Table 1. *Emotion Taxonomies*

Source	Date	Anger	Fear	Sad	Disgust	Contempt	Guilt	Shame	Interest Curiosity	Surprise	Happy Joy	Love	Other Positive
Natya-sastra ^a	A.D. 200	X	X	X	X			X				X	4 ^b
Darwin	1872	X	X	X	X	X	X	X		X	X	X	1 ^c
W. James	1890		X	X							X		1 ^d
Woodworth	1938	X	X		X	X				X	X	X	
Tomkins	1963	X	X	X	X	X		X	X	X	X		
Izard	1971	X	X	X	X	X	X	X	X	X	X		
Ekman & Friesen	1975	X	X	X	X			X		X	X		
Plutchik	1980	X	X	X	X				X	X	X		1 ^e
Shaver et al.	1987	X	X	X							X	X	

^aHejmadi, 2000. ^bFour additional positive emotions: awe, heroism, peace, humor and amusement. ^cOne additional positive emotion: pride. ^dOne additional positive emotion: mirth. ^eOne additional positive emotion: acceptance.

rence” either in English or in almost all of the 17 languages we surveyed, all of which have a synonym for risk (Rozin, Berman, & Royzman, 2001). The same “asymmetry” holds for such commonly used terms as “accident,” “catastrophe,” and “murderer.” “Savior,” the best opposite for murderer, has strong religious connotations. In addition, the word is normally used for a person who saves many lives, whereas murderer is reasonably and usually applied to the loss of one life (Rozin et al., 2001).

Language: A positive bias that supports the negative bias frequency or information account.

Within the impressions literature, there is a documented positivity bias; this appears for the ability (as opposed to the moral) domain. This makes sense in terms of the frequency or diagnostic approach to positive and negative biases; immoral behaviors and outstanding ability-based accomplishments are both rare events. We now point to a second domain where positivity bias is evident, a finding also susceptible to the frequency or diagnostic account. The positive bias in language has been noted on a number of occasions, particularly by Osgood and his collaborators (Boucher & Osgood, 1969; Osgood, 1979; Osgood, May, & Miron, 1975) and in the book devoted to positive bias or the “Polyanna Principle” by Matlin and Stang (1978).

In the domain of language, with evidence primarily but not entirely for English, a positive bias appears in two ways: (a) positive words (usually adjectives, with a clear evaluative sign) occur much more frequently than negative words (reviewed in Matlin & Stang, 1978), and (b) positive adjectives “dominate” their negative opposite in a number of ways to be described (reviewed in Matlin & Stang, 1978). We argue that at least some of this effect derives from the same causes that have been invoked to explain negativity bias.

The evaluative dimension of words and concepts is one of their paramount features, as suggested by the ancient Chinese opposition of yin and yang. This opposition emerges regularly, as the first factor extracted in analysis of the attributes of words, confirming Wundt’s (1896) initial suggestion of evaluation, potency, and activity as the three basic dimensions (Osgood, 1979). In a study across over 20 languages, there were about twice as many evaluative qualifiers commonly used as potency qualifiers (e.g., big) and more potency than activity (Osgood et al., 1975). Across languages, good is the most common qualifier, and the evaluative factor accounts for most of the variance in word attributes and meanings.

The higher positive frequency effect. Boucher and Osgood (1969), examining 13 languages, stated and

confirmed what they call the “Polyanna hypothesis”: “There is a universal human tendency to use evaluatively positive words more frequently than evaluatively negative words in communication.” Osgood et al. (1975) reported the frequency and breadth (contexts) of use of set of adjectives across over 20 diverse languages, using a composite score that increases with both frequency and breadth. “Good” scores higher than “bad” in all cultures, and “good” scores highest of all 60 common adjectives studied, in 8 of 22 languages (Osgood et al., 1975). Matlin and Stang (1978) reviewed these and many other studies, including many of their own, and made a very strong case for more frequent occurrence of positive words, principally but not entirely in English. However, they concluded that in terms of number of different negative and positive words, findings are mixed and there is no clear conclusion.

Positivity dominance. The various word positivity dominance effects described here are demonstrated for all or almost all of 17 languages in our recent study (Rozin et al., 2001). However, each was described, sometimes for English, sometimes for many languages, in at least one prior study (and many of the points we raise were documented by Matlin & Stang, 1978):

1. The unmarked positive. Greenberg (1966) showed, from many languages, that positive adjectives are usually unmarked (e.g., *happy*, *pleasant*, *intelligent*) and that negative adjectives can usually be generated from them by negating the positive attribute (*unhappy*, *unpleasant*, *unintelligent*). Furthermore, when negative adjectives do exist in their own right (e.g., *sad*, *aversive*, *stupid*), they are often not marked to generate a positive term (e.g., *unsad*, *unaversive*, *unstupid*). Matlin and Stang (1978) reviewed many other examples of this asymmetry. We confirmed the asymmetry with interviews of native speakers of 17 different languages (Rozin et al., 2001). This can be accounted for on the general principle of evolution of an efficient language: More common words would be expected to be shorter and more basic.

2. The positive term typically defines the dimension. Results from many languages suggest that typically, the positive term in a positive negative pair is the term that is used to define the dimension defined by the pair (Greenberg, 1966; Matlin & Stang, 1978; Rozin et al., 2001). Thus, in English, the happy–sad dimension is called *happiness*, and the strong–weak dimension is called *strength*. The positive term tends to be used to describe both the positive extreme and the whole dimension.

3. The marked positive term is more extreme than the marked negative term. Perhaps as a consequence of the fact that the positive term usually defines the

dimension, the marked (negated) positive term usually represents the negative end of the dimension, whereas the marked (negated) negative term represents the neutral point. Thus, *unhappy* means sad, whereas *unsad* means neutral. This asymmetry appeared in most of the 17 languages we sampled (Rozin et al., 2001).

4. Positive precedence in frozen opposite comparisons. Freezes are fixed traditional word orders, such as “cat and mouse” or “now and then.” There are no syntactic or obvious semantic rules that constrain the ordering, but there is a strong sense that a particular order is correct (Cooper & Ross, 1975). Cooper and Ross held that, in such orders of opposite valenced terms, the positive term usually comes first, as in *more or less*, *happy or sad*, or *win or lose*. The authors proposed that positive words are easier to process, and that there is some greater efficiency in leading with them. But they also reported that the order is often reversed in Hindi. Our study of 17 languages indicated that in almost all cases for word pairs and for languages, the positive term typically leads (Rozin et al., 2001).

Theory

We identify three types of theories of negativity bias: *adaptive or /evolutionary* accounts, focusing on the adaptive value of the principles; *developmental theories*, focusing on the ontogeny of the principles; and *mechanistic theories*, which try to account for the instantiation and manifestations of the principle, online. The presence of negativity bias, in various forms, in both animals and humans, encourages the promotion of at least some accounts that do not require the mediation of language or human culture.

The Adaptive Value of Negativity Bias

There are four theoretical accounts of the adaptive value of negativity bias. These adaptive accounts are mutually reinforcing and are all likely to be operative, and derive from us and from a number of prior authors (Cacioppo et al., 1994, 1997; Lewick et al., 1992; Taylor, 1991):

1. Negative potency. In the extreme, negative events are more threatening than are positive events beneficial. The clear example here is death, a final, irreversible event. Avoiding risks of death must be a matter of the highest priority in the evolutionary scheme; the peak of vigilance and investment would well be oriented to escape death. It is true that reproduction is the final measure of evolutionary success, but there are usually multiple opportunities to reproduce, and death

terminates these options. Of course, there are cases where death (as sacrifice to protect more reproductively capable relatives) contributes to inclusive fitness, especially when the organism in question is no longer capable of reproduction. Insofar as death and reproductive potential shape our decision processes and, in particular, negativity bias, these considerations suggest that the extent of our loss aversion may be programmed to vary with age. In particular, because women’s reproductive capacity declines more with age than does men’s reproductive capacity, gender differences in loss aversion might appear at the time of menopause, and there may be general age effects, as well. Of course, such effects might be moderated, especially in humans, by the many ways in which older adults can improve the fitness of their children and grandchildren.

2. Greater negative informational complexity. In general, positive entities are things to be approached and engaged. The link between appraisal and action is typically straightforward. Negative events, on the other hand, require a more sophisticated appraisal, because the options for action are more varied. These include approach (as in certain forms of threat, as mediated by the emotion of anger), freezing (sometimes appropriate in fear situations), withdrawal (sometimes appropriate when resources at hand are not adequate to deal with a situation), and fleeing (e.g., in the face of certain fear related threats). It is for this reason (mentioned earlier) that, at least in Western emotion taxonomies, there are more negative emotions (interpreted here as action tendencies; see Frijda, 1986) than positive emotions.

3. Negative events often develop more rapidly and require a rapid response. The model, of course, is predator threat. This is not a time for trial and error.

4. Negative events are more contagious and hence have more negative potential. The basic model here is the germ, for which there is not an obvious positive parallel. Minimal exposure to germs can lead to maximal effects, because germs, unlike most other negative or positive entities, are self replicating. We suggest that this germ feature may be the origin of negative contagion effects, which has, by a process of preadaptation, spread through other domains of life (such as morality) just as a germ would (Rozin, Haidt, McCauley, & Imada, 1997).

Developmental Theories

Given the adaptive advantage of particular vigilance with respect to negative events, it is quite reasonable to suppose that the negative bias is a built-in predisposition. Its presence in animals lends support to this idea. Furthermore, the opportunities for gradual learning to avoid death-threatening events may be minimal. Menzies and Clarke (1995) argued for innate

accounts of phobias and phobic predispositions, on the grounds of the terminal consequences of many negative events (like falling off a cliff). Innate fear to entities such as enlarging looming objects suggests that there is at least some inborn equipment designed to facilitate exit from, or termination of, threatening situations. There is little data available, but we expect that organisms are genetically predisposed toward greater weighting and attention to negative events. On the other hand, the organism has ample opportunity to learn that most events are positive, and that rarer, negative events, are more threatening and offer more adaptive options for response.

Neural Aspects of Negativity Bias

There is now abundant evidence, from studies of behavior in animals (e.g., Berridge & Grill, 1984) and humans (e.g., Cacioppo et al., 1994, 1997, 1999; Diener & Emmons, 1985; Watson, Clark, & Tellegen, 1988), that the negative and positive affect systems may operate quite independently at some important level prior to the generation of responses. As Cacioppo et al. noted, the constraints of action, often manifested as approach and withdrawal, may force a negative and positive summation at the response level, but there is good evidence that the negative and positive are separately represented at an earlier stage, which they call the stage of evaluative categorization. This evidence includes work on the nervous system. Ito, Larsen, Smith, and Cacioppo (1998) demonstrated larger event-related potentials for negative events in neutral contexts than for equally rare, equally valenced positive events in the same neutral contexts. Also, there seems to be an evaluative division of labor in the cortices, with the right side of the brain associated with negative affect (Davidson, 1991). This separation would presumably facilitate operation of a system that enhanced negative affect, relative to positive affect. As Cacioppo et al. pointed out, separate loci for the accumulation of positive or negative effects allow for separate currency functions (incremental rise in affect with input) for positive and negative systems. This arrangement also allows for the demonstrated somewhat independent variation of negative and positive affect, which can both be high or both be low at any given moment, although they are often reciprocally related.

Mechanistic Theories of Negativity Bias

The first two theories we present arise principally from the impressions literature (see discussions by

Fiske, 1980, and Skowronski & Carlston, 1989) and were briefly discussed in the aforementioned treatment of impressions.

Frequency and diagnosticity. Organisms are built to attend to change and to attend to more informative events. The demonstrated much lower frequency of negative than positive events makes the negative events more informative. Hence, this general informational bias would work in the service of negativity bias, as has been noted by a number of investigators (Fiske, 1980; Kanouse & Hanson, 1972; Lewick et al., 1992; Peeters, 1971; Peeters & Czapinski, 1990; Skowronski & Carlston, 1989). This position gains support from the fact that a positivity bias is observed in instances where positive events (such as manifestations of very high ability) are rarer (Skowronski & Carlston, 1992).

Range Frequency

As with the informative event formulation, another general “adaptation” principle leads to a negative bias in low frequency negative domains. Based on adaptation level theory (Helson, 1964), and its expansion into range-frequency theory by Parducci (1995), it follows from the higher frequency of positive events that the evaluative neutral point moves in the positive direction. A consequence of that, assuming that the initial magnitude of positive and negative events is about equal, is that negative events become more potent because they are now further from the acquired neutral (formerly positive) baseline than are positive events. Of course, even if negative events are originally more potent, this process would act to further enhance relative negative potency. Along with the informational value view just discussed, this position would predict a positive bias in domains where there is a higher frequency of negative events, such as performance on difficult tasks or gambling.

Contagion

We have commented on the high negative contagious potential of negative events, perhaps originating from reactions to germs. This fact about the world could be mirrored in the way the organism and brain process negative events. Negative events may inherently (or conceivably by acquisition) be more contagious, generalize more to neighboring domains, and be more resistant to elimination. There is clear evidence from the contagion literature (Nemeroff & Rozin, 2000; Rozin & Nemeroff, 1990; Rozin et al., 1989) indicating that negative entities transfer properties by

contact much more than do positive entities. Contagion is particularly appropriate as an account for situations in which both positive and negative factors are present—that is, for cases of negativity dominance. We note that both the most robust and most common instances of negativity bias, including in the impressions literature (e.g., Lupfer et al., 2000), involve such negative–positive combinations.

Purity and Perfection

Perfection and purity instantiate actually sought goals of humans in many domains. Although we typically settle for something that is less than perfect, we often judge things in terms of their distance from perfection and sometimes dichotomize into the tiny perfect, and enormous imperfect, categories. This is clearly expressed in various religious traditions that focus on purity. The human penchant for certainty may be another manifestation of this principle; people will pay much more to eliminate a risk than to reduce the risk, when the actual reduction in risk is the same in both cases (as in reducing a risk from 1% to .5% vs. .5% to 0%; Baron, Gowda, & Kunreuther, 1993). It is also common knowledge that among most collectors, “perfect” (unused, unsullied in any way) items demand by far the highest prices.

Tolstoy (1875/1998) began *Anna Karenina* with the statement, “All happy families resemble one another; every unhappy family is miserable in its own way” (p. 1). One meaning of this trenchant quote is that it is very hard to achieve perfection, and there are many ways to fail to achieve it. Blemishes can spoil kosher meat, or beautiful faces, or gems. Another statement of the same idea is in the proverb, “a chain is as strong as its weakest link.” If perfection is a sought-after goal, then we are very vulnerable to loss of this desirable state in myriads of different ways. The perfect standard primes negativity bias.

Theory and the Negativity Bias Taxonomy

The taxonomy of negativity biases we present provides a structure for the generation and evaluation of theories. Particular theories may be more appropriate for particular types of negativity bias. Thus, contagion is particularly appropriate for negativity dominance and negative potency and has little to say about differentiation. On the other hand, the asymmetry of death is most related to potency accounts, and the multiple options for response to negative events applies uniquely to negative differentiation. The frequency and diagnosticity accounts may relate to both potency and

dominance, as perhaps do the impressions phenomena that gave birth to them.

Negative potency, which has been implicitly the predominant theory prior to this article, may actually have two instantiations, as suggested by the work of Cacioppo et al. (1994, 1997, 1999). The enhancement of negativity may occur at both the level of integration of negative and positive representations, in preparation for response, and at some prior level. Furthermore, the definition of potency may have two instantiations, as suggested by some of the empirical research, especially on impressions. In the narrow form, as described in loss aversion, potency means that objectively equal oppositely valenced stimuli are subjectively unequal, with the negative stronger. However, it also appears that even when there is subjective equality, negative stimuli still seem more potent. The question is whether this residual negative potency is only manifested in combination and hence falls under negativity dominance, or might operate in isolation.

Conclusion

We do not offer a general, simple theory of negativity bias. We believe that more than one phenomenon is involved and doubt that there is one theory to account for all (in accord with Taylor, 1991). Rather, at the adaptive, developmental, and mechanistic levels, we presume there are multiple contributions to the bias; negativity bias is both multidetermined and overdetermined. However, it is far from universal. Furthermore, as Taylor noted, this very bias may be the cause of a range of adaptations to modulate the response to strong negative effects after they occur. This could be one account of the apparent lack of greater potency for negative memories.

We believe that organisms have evolved to deal with both the most frequent and the most important events in their lives; when frequency and importance are negatively correlated, as we believe is generally the case for negative and positive events, there are likely to be complexities in systems that deal with appraisal or response to negative and positive events. This is exactly what we see. The diagnosticity account, in its fully elaborated form (e.g., Skowronski & Carlston, 1989), is adequate to explain some of the occurrences of positivity and negativity biases. The fact that it predicts the inversion from the moral to the ability domain testifies to the potency of frequency and diagnosticity. On the other hand, in our view, this type of account is not helpful in certain domains, such as those that involve negative differentiation or those that invoke contagion. We are inclined to believe that it will be necessary to invoke both purity as an important human ideal and greater contagiousness of negative entities, to

account for some of the instances of negativity bias. We conclude that what is required is an analysis in the framework established by Peeters and his colleagues (Peeters, 1971, 1989; Peeters & Czapinski, 1990) and more recently by Cacioppo and his colleagues (Cacioppo et al., 1994, 1997, 1999), an interplay of positive and negative biases.

One of the major tasks of future research in this area will be to designate those domains in which negativity bias and positivity bias are manifested. We want to leave the reader with the sense that there really is a negativity bias, a meaningful and adaptive one, in much of human and animal cognition and behavior. There is still some taxonomic work to do, and a great deal of analysis. In our hope of making a better world, it should be important to understand and perhaps intervene in some manifestations of negativity bias.

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World Leaders in Research-Based User Experience

The Negativity Bias in User Experience

Summary: People remember the bad more than the good. Users’ tendency to identify flaws in designs raises the bar for what they consider acceptable.

By [Hoa Loranger](#) on October 23, 2016

Topics: [Behavior Patterns](#), [Psychology](#) and [UX](#)

Imagine you went on a beautiful hike and along the trail you encountered a rattlesnake. What do you think you will remember more vividly about the hike: the snake you encountered or the beautiful scenery along the way? Most people will remember the rattlesnake incident better, because negative experiences tend to affect them much more than positive ones. This phenomenon is an example of negativity bias.

Definition: **The negativity bias** is the tendency for **humans to pay more attention, or give more weight to negative experiences** over neutral or positive experiences. Even when negative experiences are inconsequential, humans tend to focus on the negative.

Many scientific studies document negativity biases. For example, in behavioral economics, [people tend to avoid choosing options that might result in loss](#): the bad feelings from losing \$20 are stronger than the happy feelings of finding \$20.

In social psychology, impression formation has been shown to affect negative traits disproportionately: in an election, we are more likely to vote for a candidate not because of that candidate’s personal merits, but because of the negative information about the opponent.

Think about the many compliments you have received from friends or colleagues. You probably felt flattered at the moment, but then went on with your day. Compare that to even a single snide remark. It probably affected you more deeply, maybe consumed your thoughts, and even carried over for days — or even years. To quote Linus, the Peanuts character: “Good things last eight seconds...Bad things last three weeks.”

So why are humans attuned to the negative? Bad news or negative traits signal danger. From an evolutionary perspective, learning to identify potentially hazardous situations was vital for survival in a harsh environment rich in predators. While today’s world has arguably fewer threats, humans are still wired for self-preservation.

[TOP](#)

UX Considerations

How does negativity bias manifest on the web? **A single usability flaw on your site will weigh more than the many positive features** that you’ve struggled to implement. To leave a lasting positive impression, user interfaces must not only be good, they must be great, and you must root out every single design flaw with a vengeance.

You might assume that as websites get better, people will regard them more favorably. Unfortunately, this is not the case. Our research shows that websites have improved over the years, yet users’ satisfaction ratings have remained the same — for two reasons: (1) **UX failures count more than UX successes**; (2) people judge a site by comparing it with other sites that they’ve encountered. (Remember [Jakob’s law](#): users spend most of their time on other sites.)

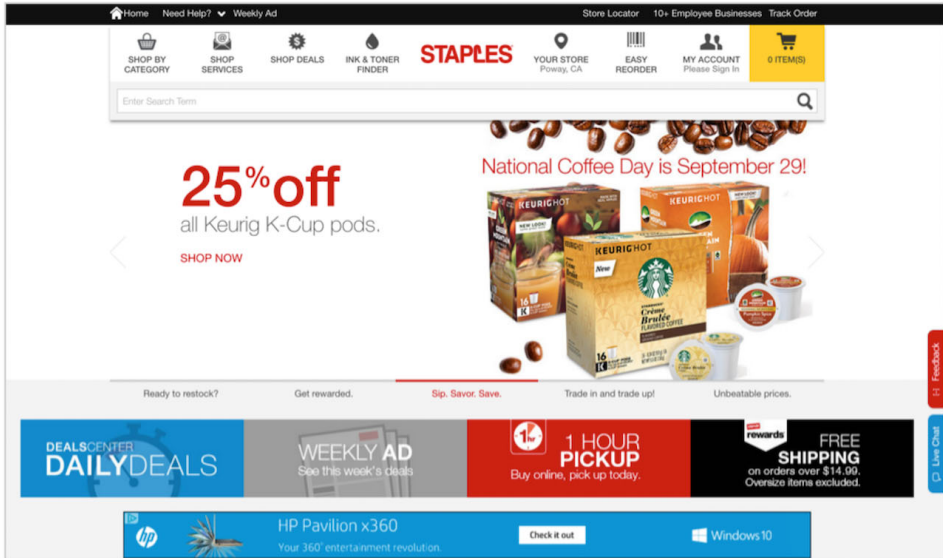
In usability studies, it is common for participants to say nothing when the UI works according to their expectations. People don’t comment or even notice a fluid experience — no matter how hard the UX team and developers worked to make this happen. But when the interaction doesn’t match their expectations, they become critical and remember the incident for a long time. I once facilitated a user test in which a participant noticed a typo early on during the session. Over an hour later she was still bothered by it and vented her disapproval. [User annoyances matter](#).

If being usable is the norm, then sites and apps must be exceptional to be memorable and noteworthy. So how can you appease vigilant users who react negatively to every single mistake? Here are a few ideas:

Case 3:19-cv-02281-K Document 223 Filed 10/02/23 Page 41 of 124 PageID 11621

- **Follow [design standards](#):** Novel interactions and design patterns require extra effort because they are unfamiliar and people can't rely on existing knowledge. When users need to find the navigation or search on a website, they expect to find them in those standard locations where they appear on hundreds of other sites.

Veering from standards too wildly can degrade the user experience. For example, our research shows that [moving the company logo from the left to center](#) makes it 6 times more difficult for people to get back to the homepage.



Staples.com: The homepage violates many navigation conventions, making it difficult to find essential elements such as the company logo, global navigation, and [store locator](#). Sure, you can find these things, but it takes longer than necessary because they are positioned in unexpected places, look different, or have non standard labels (Your store vs. Store locator).

- **Match workflows to user expectations:** Users have [mental models](#) of how the system should behave and what steps should be involved in completing tasks. Awkward workflows that present information at the wrong levels or out of sequence take control away from users and cause frustration.

A common mistake that UX designers make is to [prioritize efficiency over expectations](#). Sometimes, longer user flows are optimal if they meet user expectations, whereas shorter flows, if unconventional, can make users think.

Consider workflows from both micro and macro levels: the experience should be seamless both within a channel and across [multiple channels](#). When people engage with organizations through multiple channels, they equate the brand and the company with the total interaction, not just with the interaction within a specific channel.

- **Anticipate users' concerns and address them:** Pleasant encounters come in all forms and sizes. **Microcopy**, small bits of copy that provide instructions or alleviate concerns, can significantly boost positive impressions and prevent negative ones from ever forming. Microcopy can make a huge impact when it is presented just in time, in context, is easy to understand, and possesses the proper [tone of voice](#).



Plus 2 to 4 weeks of manufacturing time. Made by our Pennsylvania factory and shipped to you.

Quantity

— 1 +

TOTAL \$165

PREVIOUS STEP

ADD TO BAG

The microcopy on Gitman.com sets expectations in a polite and conversational manner. In most ecommerce situations, 4 weeks might be considered too long. However, this company softens the sting by emphasizing the positive aspect of the made-to-order craftsmanship. Now it's worth the wait and high price tag! (And we avoid the build-up of negativity, as people would otherwise have wondered every day why they hadn't received their shirt.)

- **Write good error messages:** Despite your best efforts to create an enjoyable user experience, websites sometimes need [error messages](#) to help people resolve unavoidable issues.

Encountering error messages is never pleasant, but in time of need, error messages can take the place of a customer-service agent. Harsh and obscure messages can turn a slight inconvenience to an antagonistic encounter. Courteous and helpful messages can mollify a potentially disastrous situation.

Search executed but no availability returned, request overlapped with festive period.

We're sorry, there are no rooms available for the dates you have requested. If your dates are flexible, please contact our [Worldwide Reservations Office](#) or speak to a hotel reservation agent at 1 (800) 321-4666.

Four Seasons Hotels and Resorts: This error message on the reservations page sounds stilted and impolite, making a bad situation worse. An interaction like this could ruin an otherwise good website.

TOP

Page Unresponsive



The following page has become unresponsive. You can wait for it to become responsive or kill it.

[Expensify] Please approve 'Farewell September 2013' - lorange

Kill




Wait

This error message illustrates an ill attempt at humor. People already have many negative associations with the word kill; its usage here fosters the negative bias.

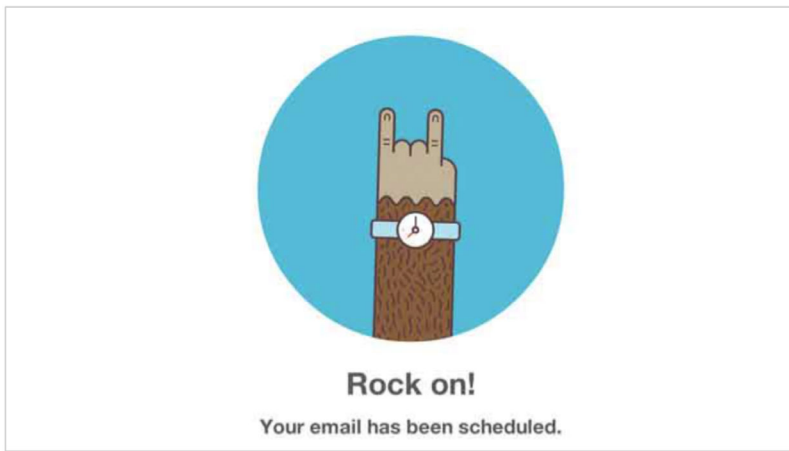
- **Sprinkle delightful encounters:** As insurance, counteract negative experiences with delightful ones. Don't be afraid to make your users smile. Sometimes, serendipitous encounters can leave lasting impressions.

Provide content that is [formatted well for scanning](#) and is written in the proper [tone of voice](#). It's not what you say, but how you say it. Our

What was your marital status on Dec. 31, 2014?

 Single	 Married	 It's complicated
---	--	---

TurboTax: The questions and options are presented clearly, using language that sounds friendly and unthreatening.



MailChimp helps administrators celebrate their accomplishment. Anyone who has sent an email newsletter to a large group of people knows how nerve wracking it feels to press that final button. This bit of playfulness is enjoyable and shows empathy.

- **Test, test, and then test:** Focus on designing usable websites that solve users' problems. Understand your users and their tasks, and go out of your way to iron out as many usability hurdles (negative encounters) as you can in order to make it easy for people to reach their goals.

TOP

A core tenet of usability is recognizing that **you are not your user**. It is impossible to anticipate every user reaction or behavior. Conducting [user research](#) helps you reduce design risk by making decisions grounded in evidence, not personal bias. Never assume that your ideas are great. Always validate new or innovative ideas with real customers to minimize wasted effort.

Conclusion

Functionality and usability in user interfaces are required for success and should be your priority. However, don't stop there. Account for negativity bias by going beyond user expectations and strive for delightful experiences.

Learn more on how to apply psychological principles in UX in our [Human Mind Course](#). Learn to write for the Web in our [Writing Compelling Digital Copy](#) course.

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UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF TEXAS
DALLAS DIVISION

---oOo---

FEDERAL TRADE COMMISSION,

Plaintiff,

vs.

No. 3:19-cv-02281-K

MATCH GROUP, INC., a
corporation, MATH GROUP, LLC,
formerly MATCH.COM, LLC, a
Limited Liability Company,

Defendants.

_____/

DEPOSITION OF
JENNIFER KING, PH.D.

CONFIDENTIAL

THURSDAY, JULY 27, 2023

REPORTED BY: HOLLY THUMAN, CSR No. 6834, RMR, CRR
JOB NUMBER 6028094


Page 1

<p>1 workbooks.</p> <p>2 Q. How were they guided, if you know, in what to</p> <p>3 look for in a heuristic analysis?</p> <p>4 A. Well, I mean, we were all familiar with</p> <p>5 Nielsen's Ten Heuristics. That's why I work with them.</p> <p>6 Q. And by "Nielsen's Ten Heuristics," can you</p> <p>7 define what you mean?</p> <p>8 A. Jakob Nielsen's 10 Usability Heuristics. I</p> <p>9 don't have them memorized, but I'll be happy to read</p> <p>10 them off if you have a copy of that article.</p> <p>11 Q. I do, and we'll talk about that later.</p> <p>12 Do you know what the Nielsen Norman Group is?</p> <p>13 A. I sure do.</p> <p>14 Q. So what is it?</p> <p>15 A. So it's a consulting firm that was founded by</p> <p>16 Jakob Nielsen and Professor Donald Norman. I'm not</p> <p>17 sure when; mid- or late '90s.</p> <p>18 But Nielsen was a usability expert and</p> <p>19 researcher, I believe, at Sun Microsystems.</p> <p>20 Donald Norman's been a professor of cognitive</p> <p>21 psych at UC San Diego, I think, for decades.</p> <p>22 And so they formed a research and consulting</p> <p>23 group during the first dot-com boom.</p> <p>24 Q. Do you consider the Nielsen Norman Group to</p> <p>25 have authoritative expertise in the field of usability?</p> <p style="text-align: right;">Page 10</p>	<p>1 you were asking; heuristic analysis and --</p> <p>2 Q. How much time you actually spent looking at</p> <p>3 the website versus how much time you spent doing the</p> <p>4 heuristic analysis versus the writing.</p> <p>5 A. I mean, that's hard to say because you go back</p> <p>6 and look at the website continuously as you're writing.</p> <p>7 But, you know, as an independent task, looking</p> <p>8 at the website, I'm going to guess in the magnitude of</p> <p>9 5 to 10 hours.</p> <p>10 Q. Do you agree that the purpose of heuristic</p> <p>11 analysis or a heuristic evaluation is to find usability</p> <p>12 problems on an interface?</p> <p>13 A. Yes.</p> <p>14 Q. Okay. And do you agree that a heuristic</p> <p>15 evaluation is difficult for a single individual to do</p> <p>16 because one person will never be able to find all the</p> <p>17 usability problems on an interface?</p> <p>18 A. I disagree that it's difficult to do. I think</p> <p>19 you have to understand Nielsen's framing of what a</p> <p>20 heuristic analysis is supposed to accomplish.</p> <p>21 So it -- if I may, Nielsen developed this --</p> <p>22 this method in order to give practitioners a way to</p> <p>23 provide a -- a concise analysis without the need or</p> <p>24 requirement to engage in user testing in order to spot</p> <p>25 a handful of particular canonical usability issues.</p> <p style="text-align: right;">Page 12</p>
<p>1 A. I do.</p> <p>2 Q. Can you tell me how much time each of the</p> <p>3 individuals who worked on your heuristic analysis with</p> <p>4 you spent analyzing Match.com cancellation web flows?</p> <p>5 A. I would have to look at my record. I don't</p> <p>6 remember off the top of my head. Not as much as me,</p> <p>7 but --</p> <p>8 Q. And how much did you spend doing your</p> <p>9 heuristic analysis?</p> <p>10 A. I would have to go back to my records. I</p> <p>11 don't have a clear division of that piece versus the</p> <p>12 writing piece versus, you know, everything else.</p> <p>13 Q. So, as you sit here today, you can't discern</p> <p>14 between the amount of time you spent doing the analysis</p> <p>15 versus the analysis -- excuse me, the heuristic study</p> <p>16 versus the analysis versus the writing?</p> <p>17 MR. AIJAZ: Objection. Misstates testimony.</p> <p>18 THE WITNESS: I mean, I can estimate for you.</p> <p>19 BY MR. HUMMEL:</p> <p>20 Q. Please.</p> <p>21 A. Okay. So I probably spent in the order of</p> <p>22 5 to 10 hours working through the heuristic analysis.</p> <p>23 I'm trying to remember how much time I spent writing.</p> <p>24 There was a lot of writing.</p> <p>25 And, I'm sorry, what was the other piece of it</p> <p style="text-align: right;">Page 11</p>	<p>1 So it comes out of a tradition I would argue</p> <p>2 he started called "discount usability." This was back</p> <p>3 in the early '90s, mid-1990s, and he was essentially</p> <p>4 trying to develop this method in order to, I would say,</p> <p>5 democratize, essentially, this practice to make it more</p> <p>6 widespread.</p> <p>7 So it is a way of identifying errors without</p> <p>8 having to engage in user testing.</p> <p>9 That said, it does not necessarily uncover all</p> <p>10 errors, and user testing can also find different</p> <p>11 errors.</p> <p>12 Q. You did not do a usability study. Correct?</p> <p>13 A. I did not do a usability study.</p> <p>14 Q. Is it true, as Jakob Nielsen wrote in</p> <p>15 November 1, 1994, in his article called "How to Conduct</p> <p>16 a Heuristic Analysis," that the output from using the</p> <p>17 heuristic evaluation method is a list of usability</p> <p>18 problems in the interface with references to those</p> <p>19 usability principles that were violated by the design</p> <p>20 in each case in the opinion of the evaluator?</p> <p>21 A. Yeah.</p> <p>22 MR. AIJAZ: Objection. Form.</p> <p>23 THE WITNESS: Sorry.</p> <p>24 I mean, as you have read that definition, I --</p> <p>25 yes, I agree with the way he has described it.</p> <p style="text-align: right;">Page 13</p>

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<p>1 I mean, it's -- it is a way of conducting 2 research. You can use it across many contexts. It's 3 not necessarily that you must have an existing -- 4 another author who has said, "I have used this to study 5 cancellations." 6 So it is a -- I mean, my expertise is a 7 synthesis of the research, you know, across this field 8 and, as I cite in my report, to bring to bear on the 9 question presented in here. 10 Now, you know, has a heuristic analysis ever 11 been used to answer this question outside of my work? 12 Most likely, it has; it just isn't necessarily that 13 other people have documented it in such a way that they 14 have publicly stated it. 15 BY MR. HUMMEL: 16 Q. In the -- in two of the cases that you cited 17 where you provided an expert opinion, Commerce Planet 18 and then FTC via Amazon, in the FTC v. Amazon case, you 19 used a heuristic analysis of the in-app purchase 20 process. Correct? 21 A. Yes. 22 Q. And you looked at an analysis of consumer 23 complaints. Right? 24 A. Yes. 25 Q. Why didn't you include your analysis of</p> <p style="text-align: right;">Page 78</p>	<p>1 A. Well, he's an economist. He has no background 2 in qualitative research, so I'm not exactly sure why 3 he's offered to have a basis on evaluating qualitative 4 research. 5 Q. What basis did you have to assess the veracity 6 and reliability of the complaint that you assessed? 7 A. Because I have been trained in qualitative 8 methods. 9 Q. You didn't talk to any of those consumers. 10 Right? 11 A. No. I did not. 12 Q. You read reports that they had submitted. 13 Correct? 14 A. Well, some of them appear to be transcripts or 15 summaries by customer service agents, and some appear 16 to be actual emails. 17 Q. Hold on. That's a very important distinction. 18 How many were transcripts versus summaries? 19 A. I am not sure. 20 Q. Were there any transcripts? 21 A. Well, I mean, I don't know if they were 22 transcripts or notes put in by customer service agents. 23 Q. Very -- 24 A. That's not entirely clear. 25 Q. Well, did you ask?</p> <p style="text-align: right;">Page 80</p>
<p>1 consumer complaints in your initial report? 2 A. So the initial report was conducted on an 3 extremely tight timeline, first off, and I did not have 4 time to review consumer complaints in that time period. 5 Q. So you intended to do it but didn't have time? 6 A. It was certainly on the table. 7 I mean, it depended, quite frankly, on -- in 8 part on what Mr. Ward's report was going -- what 9 territory he was covering. 10 Q. Yeah. 11 In what way does your analysis of -- your 12 purported analysis of consumer complaints rebut what 13 Mr. -- anything that Mr. Ward said? 14 It doesn't rebut his heuristic analysis, does 15 it? 16 A. I think it offers firsthand opinions from 17 actual customers as to the problems they experienced on 18 the site, and many of those things speak directly to 19 the design of the site and specific issues that they 20 encountered. 21 Q. Have you read Mr. Langenfeld's critique of 22 your consumer complaint analysis? 23 A. I have. 24 Q. Do you have any questions or concerns about 25 his analysis?</p> <p style="text-align: right;">Page 79</p>	<p>1 A. There is a column in the spreadsheet that 2 appears to denote where the source is, but when looking 3 at those, it isn't entirely always clear to me if it 4 were -- if it was an agent summarizing or, you know, if 5 they're quoting from something. 6 Q. My question was: Did you ask whether or not 7 these are verbatim quotes, or are they summaries of 8 what the customer service agent perceived the consumer 9 to have said? 10 A. No. I did not ask. 11 Q. Okay. So you can't testify one way or the 12 other as to what they, in fact, are. Correct? 13 MR. AIJAZ: Objection. Vague. 14 THE WITNESS: I mean, I can tell you what I 15 understand them to be. 16 BY MR. HUMMEL: 17 Q. What do you understand them to be? 18 A. They are either quotes from customer service 19 agents or summaries from customer service agents. 20 Q. Does it matter which one to you? 21 MR. AIJAZ: Objection. Vague. 22 THE WITNESS: I would say it really depends on 23 the -- the content inside -- or discussed in each one. 24 BY MR. HUMMEL: 25 Q. If someone calls up customer service,</p> <p style="text-align: right;">Page 81</p>

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<p>1 --o0o--</p> <p>2 I declare under penalty of perjury that the</p> <p>3 foregoing is true and correct. Subscribed at</p> <p>4 _____, California, this ____ day of</p> <p>5 _____ 2023.</p> <p>6</p> <p>7 _____</p> <p>8 JENNIFER KING, PH.D.</p> <p>9</p> <p>10</p> <p>11</p> <p>12</p> <p>13</p> <p>14</p> <p>15</p> <p>16</p> <p>17</p> <p>18</p> <p>19</p> <p>20</p> <p>21</p> <p>22</p> <p>23</p> <p>24</p> <p>25</p> <p style="text-align: right;">Page 234</p>	<p>1 M. Hasan Aijaz</p> <p>2 maijaz@ftc.gov</p> <p>3 August 10, 2023</p> <p>4 RE: Federal Trade Commision v. Match Group, Inc., Et Al.</p> <p>5 7/27/2023, Dr. Jennifer King (#6028094)</p> <p>6 The above-referenced transcript is available for</p> <p>7 review.</p> <p>8 Within the applicable timeframe, the witness should</p> <p>9 read the testimony to verify its accuracy. If there are</p> <p>10 any changes, the witness should note those with the</p> <p>11 reason, on the attached Errata Sheet.</p> <p>12 The witness should sign the Acknowledgment of</p> <p>13 Deponent and Errata and return to the deposing attorney.</p> <p>14 Copies should be sent to all counsel, and to Veritext at</p> <p>15 errata-tx@veritext.com.</p> <p>16</p> <p>17 Return completed errata within 30 days from</p> <p>18 receipt of testimony.</p> <p>19 If the witness fails to do so within the time</p> <p>20 allotted, the transcript may be used as if signed.</p> <p>21</p> <p>22 Yours,</p> <p>23 Veritext Legal Solutions</p> <p>24</p> <p>25</p> <p style="text-align: right;">Page 236</p>
<p>1 CERTIFICATE OF REPORTER</p> <p>2 I, HOLLY THUMAN, a Certified Shorthand</p> <p>3 Reporter, hereby certify that the witness in the</p> <p>4 foregoing deposition was by me duly sworn to tell the</p> <p>5 truth, the whole truth, and nothing but the truth in</p> <p>6 the within-entitled cause; that said deposition was</p> <p>7 taken down in shorthand by me, a disinterested person,</p> <p>8 at the time and place therein stated; and that the</p> <p>9 testimony of the said witness was thereafter reduced to</p> <p>10 typewriting, by computer, under my direction and</p> <p>11 supervision;</p> <p>12 That before completion of the deposition,</p> <p>13 review of the transcript [X] was [] was not</p> <p>14 requested/offered. If requested, any changes made by</p> <p>15 the deponent (and provided to the reporter) during the</p> <p>16 period allowed are appended hereto.</p> <p>17 I further certify that I am not of counsel or</p> <p>18 attorney for either or any of the parties to the said</p> <p>19 deposition, nor in any way interested in the event of</p> <p>20 this cause, and that I am not related to any of the</p> <p>21 parties thereto.</p> <p>22</p> <p>23 </p> <p>24 HOLLY THUMAN, CSR No. 6834</p> <p>25</p> <p style="text-align: right;">Page 235</p>	<p>1 Federal Trade Commision v. Match Group, Inc., Et Al.</p> <p>2 Dr. Jennifer King (#6028094)</p> <p>3 E R R A T A S H E E T</p> <p>4 PAGE____ LINE____ CHANGE_____</p> <p>5 _____</p> <p>6 REASON_____</p> <p>7 PAGE____ LINE____ CHANGE_____</p> <p>8 _____</p> <p>9 REASON_____</p> <p>10 PAGE____ LINE____ CHANGE_____</p> <p>11 _____</p> <p>12 REASON_____</p> <p>13 PAGE____ LINE____ CHANGE_____</p> <p>14 _____</p> <p>15 REASON_____</p> <p>16 PAGE____ LINE____ CHANGE_____</p> <p>17 _____</p> <p>18 REASON_____</p> <p>19 PAGE____ LINE____ CHANGE_____</p> <p>20 _____</p> <p>21 REASON_____</p> <p>22 _____</p> <p>23 _____</p> <p>24 Dr. Jennifer King Date _____</p> <p>25</p> <p style="text-align: right;">Page 237</p>

60 (Pages 234 - 237)

Expert Report of Dr. Jennifer King

FTC vs. Match Group, Inc. and Match Group, LLC.

Jan. 13, 2023

Table of Contents

1. Summary of Conclusions	3
2. Qualification Statement	6
3. Overview of Method	9
A. Introduction to Human-Computer Interaction	9
B. Heuristic Analysis Methods	11
C. “Dark” Design Patterns	15
4. Heuristic Analysis of Match.com’s Cancellation Flow	21
A. Overview of Match.com Cancellation Process	22
I. 2016 Cancellation Process	24
II. 2019 Cancellation Process	31
III. 2022 Cancellation Process	34
B. Analysis of Cancellation Process	35
I. Violation of Usability Heuristics	36
a. Visibility of System Status	36
b. Consistency and Standards	37
c. Aesthetic and Minimalist Design	38
II. Dark Patterns in the Cancellation Process	40
a. Obstruction	41
b. Forced Action	42
c. Hidden Information	44
d. Content Strategy	45
1. Inconsistent Language	46
2. Confusing Terminology	50
III. The Password Authentication Screen	52
a. Password Friction: Balancing Users’ Security and Ease of Access	52
5. Conclusion: Putting the Heuristic Analysis into Perspective	57
A. Evidence from Company Documents	59
B. Competitor Practices	62
C. Conclusion	65
Appendix I: Dr. King’s CV	66
Appendix II: List of all cases Dr. King was deposed or testified at trial	74

1. Summary of Conclusions

Match is an online dating service established in 1995 with as many as 21.5 million members. The company describes its mission as helping “singles find the kind of relationship they’re looking for.”¹ Match.com allows members to post photos, written expressions, and relationship preferences to their profile and operates an “anonymous” email network by which members’ profile remains private until they confirm a match. The company advertises several subscription packages, including a six month subscription which, prior to mid-2019, featured a “Match Guarantee.” Despite these offers, multiple customers have filed complaints about their difficulty and/or inability to cancel their subscriptions. The FTC’s complaint calls Match.com’s cancellation process “convoluted and confusing;” this is corroborated by statements from Match.com’s head of customer service: “it’s been the same complaint for the past decade that I’ve been with Match . . . It takes up to 7 or 8 clicks to complete the flow to turn off [subscriptions] if you can even figure out how to do it.”^{2, 3}

The FTC asked me to evaluate Match.com’s cancellation flow based on the following inquiries:

1. Was Match.com’s cancellation process easy to use?

2. Was Match.com’s cancellation process easy to find?

I examined the cancellation flow for 2016, 2019, and 2022, documenting changes to password screens, buttons, links, and copywriting. Based on this evidence, I conclude the following:

¹ <https://www.match.com/help/aboutus.aspx?lid=4>

² 116 - First Amended Complaint.pdf, 20.

³ MATCH320168_image.pdf

Q1: Was Match.com's cancellation process easy to use?

No. Match.com's cancellation procedure was not easy or simple to use.

- The lack of breadcrumb navigation (2022), labeling of steps, and visibility of system status makes it hard for users to know where they are in the cancellation process.
- Inconsistent design and labeling at various steps in the process was confusing.
- The inclusion of extraneous steps, including password authentication and survey questions, introduced unnecessary friction and made the cancellation process longer than necessary and more difficult.

Q2: Was Match.com's cancellation process easy to find?

No. Match.com's cancellation process was not easy for users to locate.

- The discoverability of the cancellation process is buried under indirect settings and language (e.g. "Manage Subscription," "Manage Account").
- Similarly, Match.com's help site buries information about subscription cancellation in their help pages under a "See all articles" link. Upon clicking it, the "Canceling" page appears at the bottom of the help site.
- There is one primary pathway to cancellation; I could locate only one secondary pathway, with the link buried in the help page described above.

In investigating the ease of use and findability of Match.com's cancellation process, I found several forms of dark design patterns including: obstruction ("Roach Motel"), forced action, hidden information, and 'confirmshaming' language. These patterns are harmful in that they block users from leaving an online service, compel users into undesired actions, withhold information, and pressure users through word choice and images. Moreover, I identified several points within

the cancellation flow that could cause user abandonment, including the password authentication screen and survey steps. The survey, which was not indicated as optional or skippable, was spread over two disconnected pages and featured multiple questions including a Likert scale and open text field. Existing best practices indicate that an appropriate stage to survey users would be in a post-cancellation email or post-cancellation page.

Additionally, I determined that the password screen was arbitrarily placed in the cancellation flow compared to other Account Settings that did not require password authentication. Ultimately, the cancellation flow could have been reduced to four page-steps versus Match.com's eight page-step process.

2. Qualification Statement

I am presently a research fellow at Stanford University, where I focus on topics related to information privacy and artificial intelligence. I obtained my Ph.D. in Information Management and Systems (Information Science) from the University of California, Berkeley School of Information in 2018, with an emphasis in Human-Computer Interaction (HCI), information law and policy, and social computing. Prior to starting my current role in January 2021, I was the Director of Consumer Privacy at the Center for Internet and Society at Stanford Law School. I am an internationally recognized expert on data privacy issues, and I am often a speaker at a wide range of academic, civil society, regulatory, and industry-sponsored conferences and events. Prior to obtaining my Ph.D. and working in the research field, I received a Master of Information Management and Systems (MIMS) degree in 2006, also from the U.C. Berkeley School of

Information. I also worked for nearly a decade in the Internet software industry, as both a product manager and web producer, where my work encompassed a range of companies and specialties.

A key area of my expertise focuses on how graphical user interfaces are designed in ways that promulgate deception, confusion, coercion, or manipulation of people encountering this content, either through deliberate intent on the part of designers, or through poor design choices. This area of study, commonly called “dark patterns,” has exploded in the last five or more years as the presence of dark patterns has become widespread across the commercial internet.⁴ This work has been explored by UX practitioners, academic and HCI researchers including Harry Brignull, Arunesh Mathur, Colin M. Gray, whose work is cited throughout this report. Once the province of smaller companies engaged in deceptive, illicit schemes, they have been widely adopted by a range of companies with legitimate business models that nonetheless use dark patterns to impose time-pressured purchase decisions, push consumers to disclose excessive amounts of personal information that they might otherwise prefer not to disclose, or make it difficult for consumers to perform actions such as unsubscribing from paid services.

⁴ See generally: Jamie Luguri, Lior Jacob Strahilevitz, Shining a Light on Dark Patterns, *Journal of Legal Analysis*, Volume 13, Issue 1, 2021, Pages 43–109, <https://doi.org/10.1093/jla/laaa006>; Arunesh Mathur, Gunes Acar, Michael J. Friedman, Elena Lucherini, Jonathan Mayer, Marshini Chetty, and Arvind Narayanan. 2019; *Dark Patterns at Scale: Findings from a Crawl of 11K Shopping Websites*. Proc. ACM Hum.-Comput. Interact. 3, CSCW, Article 81; Arunesh Mathur, Jonathan Mayer & Mihir Kshirsagar, *What Makes a Dark Pattern... Dark?: Design Attributes, Normative Considerations, and Measurement Methods*, Proc. 2021 CHI Conf. on Hum. Factors Computing Sys. (2021); Colin M. Gray, Yubo Kou, Bryan Battles, Joseph Hoggatt & Austin L. Toombs, *The Dark (Patterns) Side of UX Design*, 2018 Proc. 2018 CHI Conf. on Hum. Factors Computing Sys., 9–10; Caroline Sindors and Sebastian Rieger, Policy Brief: Dark Patterns - Regulating Digital Design, Stiftung Neue Verantwortung (May 13, 2020), <https://www.stiftung-nv.de/en/publication/dark-patterns-regulating-digital-design/>; Jennifer King and Adriana Stephan. Regulating Dark Patterns in Practice – Applying the California Privacy Rights Act. *Georgetown Technology and Law Review*. 5 Geo. L. Tech. Rev. 251 (2021).

My interest in dark patterns as a research area began with my study of privacy policies and other forms of online disclosures, where I investigated consumer comprehension of policies and disclosures in online and mobile environments, and related issues regarding their design, framing, placement, and content. Based on my research experience, I have consulted as an expert witness on numerous cases related to dark patterns and deceptive design choices since 2009. I have given multiple public presentations on the topic of dark patterns (including participating in a FTC public workshop on the topic), consulted with the California Attorney General's office regarding the use of dark patterns in connection with its landmark privacy law, the California Consumer Privacy Act, and published a law review article on issues related to regulating dark patterns (included in my CV). As of December 2021, along with colleagues at Stanford University's Digital Civil Society Lab, I co-direct the Dark Patterns Tip Line, located at: <https://darkpatternstipline.org/>. This website is an online resource that continues to expand using submissions of dark patterns from the public.

Attached to this report as Appendix I is my current Curriculum Vitae (CV) with a list of all of my publications, and a list of all of the cases in which I have testified as an expert at trial or by deposition in the past decade under "Litigation Consulting" under Appendix II.

3. Overview of Method

The method I used to evaluate this matter and form my expert conclusions and opinions are based primarily upon my academic and professional training in Human-Computer Interaction (HCI), original research, and review of related work by other academics and professionals. In this section, I will provide an overview of HCI, the methods I used to render my conclusions and opinions, and specific details about the topic of “dark patterns” and why dark patterns are relevant to this case.

To form my conclusions and opinions in this matter, I conducted my research process as follows:

1. Reviewed amended complaint filed by the FTC.
2. Reviewed screen captures and screenshots of the cancellation flow, public-facing Frequently Asked Questions (FAQ) and other screen captures from Match.com, performed a heuristic analysis, and formed conclusions regarding questions of consumer confusion.
3. Reviewed internal company documents discussing the cancellation flow.

I employed two researchers to assist me with my research and analysis in this matter. I am being compensated at a rate of \$450/hr. My compensation in this matter is not contingent on my findings.

A. Introduction to Human-Computer Interaction

Human-Computer Interaction, or HCI, is the study of how humans engage with computer interfaces. HCI is rooted in the field of human factors and ergonomics, which studies how humans interact with the physical world in order to improve the effectiveness, safety, and usability of specialized machines. With the advent of computers, HCI emerged as a field distinct from the study of human factors. In its early days, HCI research was still closely tied to human factors, focusing on the physical aspects of computer use, such as the shape of a keyboard or mouse. After

command-line interfaces gave way to graphical displays, the field expanded to include a range of topics relating to the visual aspects of computer displays, from human visual perception (how the eye processes sensory data) to human cognition (how the brain interprets and classifies information). As this range suggests, HCI is a broad interdisciplinary field that can include experts from a number of university departments, including computer science, engineering, linguistics, psychology, and information science.⁵

In addition to being an academic field, HCI is also an applied discipline with a strong presence in the private sector. Practitioners drive advances in HCI as much as—if not more than in some areas—academics do, and leading journals such as the *Journal of Usability Studies* and conferences such as ACM SIGCHI (Conference on Human Factors in Computing Systems)⁶ publish work from both private sector practitioners and academics. Many major technology companies employ in-house HCI practitioners, often with titles such as User Experience Designer, Developer, or Researcher, who collaborate with visual designers to develop software and website interfaces. These practitioners are an integral part of the design and development process, and large technology companies typically will not launch online and software products until HCI practitioners have evaluated them. Companies also seek advice from independent HCI consultants.

HCI findings are typically derived from data gathered using both quantitative and qualitative methods, such as: usability inspections, usability tests, focus groups, interviews, examinations of customer feedback (both solicited and unsolicited, e.g., through customer complaints), and other

⁵ <https://uxpajournal.org/>

⁶ <https://chi2023.acm.org/>

methods. HCI research has yielded several principles of usability—or heuristics—as well as more domain-specific guidelines that can be applied to evaluate any interface. These principles are important tools for HCI practitioners tasked with evaluating software applications. By evaluating Internet content according to these principles (also called a “usability inspection”)—that is, reviewing an application interface for compliance with an accepted set of heuristics—HCI experts can identify common usability problems in an interface. Many of these principles are based on “user-centered design,” a concept originated in Don Norman’s foundational text *The Design of Everyday Things*, that is employed internationally and embraced by leading websites, design consultants, and user experience/usability professionals⁷. Through a variety of methods, user-centered design seeks to understand application and interface design from the customer’s (user’s) point of view.

B. Heuristic Analysis Methods

In this case, I used a heuristic evaluation (also called a usability inspection) to evaluate the Match.com interface for conformity with canonical heuristic guidelines and principles created by both academic researchers and professionals (citations made throughout as applied). A heuristic evaluation is made based on HCI principles derived from empirical research and involves the review of a user interface specifically for compliance with these principles, from a visual and information design perspective, as well as assessing the design of the interface and reviewing specific tasks from the user’s perspective.⁸ This approach can provide similar insights to those generated through user testing without the recruitment of participants. Usability inspections can

⁷ Don Norman, *The Design of Everyday Things*, Basic Books (1988).

⁸ Agnes Deneka, *Usability Inspection Methods*, Trimble (April 15, 2021), <https://modus.trimble.com/news/2021-04-15-usability-inspection-methods/>

be used to examine interfaces prior to launching, or existing interfaces for flaws after they have been launched and put into use, particularly when user feedback or additional testing has identified potential problems. In this report, I limit my analysis to the design of the Match.com subscription cancellation flow within the date ranges of the evidence provided to me (2016 through 2022).

Leading researchers in the field, such as Jakob Nielsen, Ph.D., Professor Ben Schneiderman, Ph.D., Donald Norman, Ph.D., and Bruce Tognazzini have distilled the most fundamental usability principles, for example: “The system should always keep users informed about what is going on, through appropriate feedback within reasonable time.”⁹ They have also created sets of guidelines that address web design at a more granular level, for example, because people typically scan webpages in an “F-shaped” pattern, it is best to design content in a predictable, easily scannable way to enhance easy readability by using “information-carrying” words and stating the most important information first.¹⁰ This inverted-pyramid method better sustains readership by fronting the most necessary details where users are most likely to see and engage them.^{11,12} This report is informed by decades of usability testing and design evaluations conducted by cognitive psychologists and HCI experts.

⁹ Jakob Nielsen, 10 Usability Heuristics for User Interface Design, Nielsen Norman Group (updated Nov. 15, 2020), <https://www.nngroup.com/articles/ten-usability-heuristics/>; see also Heuristic Evaluations and Expert Reviews, Usability.gov, <https://www.usability.gov/how-to-and-tools/methods/heuristic-evaluation.html>.

¹⁰ <https://www.nngroup.com/articles/f-shaped-pattern-reading-web-content-discovered/>

¹¹ University of Maryland, Baltimore. UMB Website Manual, Best Practices for Web Writing. <https://www.umb.edu/cpa/toolbox/website-manual/prepare/web-writing/#:~:text=It's%20a%20writing%20style%20where,few%20sentences%20or%20bullet%20points.>

¹² Jakob Nielsen, Inverted Pyramids in Cyberspace, Nielsen Norman Group (updated 2015).

<https://www.nngroup.com/articles/inverted-pyramids-in-cyberspace/>

My analysis of the Match.com cancellation flow focuses on the following aspects most relevant to a usability inspection of disclosures or other information communicated to users by an interface:

- Placement and prominence: A key issue for evaluating whether an individual design feature is effective is its placement on the screen in relation to other elements (e.g., where is it in the visual hierarchy),¹³ as well as how prominent it is (e.g. whether it competes with other objects on the screen).¹⁴ Prominence refers to how conspicuous a design feature is in relation to other textual and graphical elements on the page, as well as the grouping and alignment of the items, which provide a visual flow for the user to follow.¹⁵
- Appearance: Appearance refers to the visual elements of the disclosure, such as font selection, text size, and color.¹⁶ In conjunction with placement and prominence, these elements influence how conspicuous a design element is to the user.
- User Flow Architecture: In order to understand the context in which a choice is presented and the resulting decision(s) a user must make, it is necessary to document the flow, i.e., the steps one must take through the application to arrive at a decision point, and the options available to the user after making a specific choice. By documenting these paths, one can discover potential flaws in how information is presented to users, as well as gain insight into why users take particular actions.¹⁷

¹³ Jeff Johnson, *Designing with the Mind in Mind: Simple Guide to Understanding User Interface Design Guidelines* 2nd Edition (Morgan Kaufmann; 2nd edition (February 24, 2014).

¹⁴ Jenifer Tidwell, Charles Brewer, and Aynne Valencia. *Designing Interfaces, 3rd Edition* (O'Reilly 2019).

¹⁵ *Id.*

¹⁶ Jakob Nielsen *et al.*, *Prioritizing Web Usability* (New Riders 2006).

¹⁷ Louis Rosenfeld *et al.*, *Information Architecture for the Web and Beyond* (O'Reilly 2015).

- System status and feedback: Documenting what the application is telling the user about what is currently happening within the application and what occurs after she makes a decision is crucial for determining if the users understand where they are in a flow, and what their options are.¹⁸ The system status includes task interruptions: instances where the user is interrupted from their primary goal to attend to a completely different task.¹⁹
- Terminology/Content Strategy: The terms used to communicate choices, system status, and feedback to the users are important for helping them understand system functions. Clear, consistent terminology is essential to user understanding. When there is a mismatch between the terms used by the application and those understood by the users, confusion can result.²⁰
- Readability: Users generally scan online text rather than read it thoroughly, and this is particularly true with long paragraphs of text. According to Nielsen, “dense blocks of text are a major turn-off for Web users,” suggesting to users that they will have to “work hard to extract the information they want.”²¹
- Friction: Design friction refers to “interactions that inhibit people from intuitively and painlessly achieving their goals within a digital interface.”²² A common outcome of design friction is the user exiting or abandoning the task in frustration or confusion. While there are instances of friction that help users, these cases are largely centered around interventions and systems that encourage mindful behavioral change (e.g. keeping a diet

¹⁸ Nielsen, 10 Usability Heuristics, *supra*; Johnson, *supra* at 131.

¹⁹ Michael Albers, Human-Information Interaction and Technical Communication: Concepts and Frameworks (IGI Global 2012).

²⁰ Johnson, *supra* at 131.

²¹ Nielsen, *Prioritizing Web Usability*, *supra*.

²² Victoria Young, Strategic UX: The art of reducing friction. *InfoDesign* (February 13, 2015)

journal).²³ These examples *do not* forgo the principles listed above or hinder users from completing desired tasks. A designer should aim to *reduce* friction that hinders users from completing desired tasks or causes users to abandon the task (or system) entirely.

The research literature demonstrates that all of these usability aspects—placement, prominence, and appearance—are critical to the effective disclosure of information. These concepts are tied to the visual hierarchy and layout of both graphical and textual elements in an interface. As Tidwell phrases it, “the most important content should stand out the most, and the least important should stand out the least.”²⁴ The point at which a design element is placed in the user flow has a direct impact on whether it is viewed and acted upon. The feedback the system provides to the user about what state the system is currently in, and what the user’s options are, has a direct effect on the user’s comprehension of a design feature and the actions they can or cannot take as a result. The terminology used to describe an action, as well as its readability on-screen, also impact whether its presentation is effective. Finally, a user interface must minimize (or eliminate) unnecessary friction that prevents the user from achieving her goals. The interface should strike a balance, allowing the user to complete their tasks easily and efficiently while minimizing room for user error.

C. “Dark” Design Patterns

“Dark” design patterns (also called manipulative or deceptive design patterns) are design features that deceive, coerce, or manipulate users into making choices that are either not what users

²³ Anna L. Cox et al. Design Frictions for Mindful Interactions: The Case for Microboundaries. In Proceedings of the 2016 CHI Conference Extended Abstracts on Human Factors in Computing Systems (CHI EA '16). Association for Computing Machinery, New York, NY, USA, 1389–1397. <https://doi.org/10.1145/2851581.2892410>

²⁴ Tidwell, *supra*.

intended, or are not in their best interests. This report analyzes whether the design of Match.com’s cancellation flow used dark design patterns.

As background, in the visual design literature, design patterns are “reusable/recurring components which designers use to solve common problems in user interface (UI) design,” such as navigation menus for webpages or mobile devices.²⁵ Architect Christopher Alexander characterizes design patterns as well-verified solutions to recurring problems that are *replicable* and *adaptable* to each designer’s case, preferences, and local problem conditions.^{26, 27} Design patterns are helpful hallmarks for designers in answering problems quickly and efficiently; however, some variants of these patterns routinely work against users’ interests. Design patterns are adopted as best practices based on results from user research and practitioner experience, with an expectation that they represent a benefit to the user, in terms of efficiency, minimal cognitive burden, or simplicity. Online interfaces should *reduce* users’ cognitive load: “the amount of mental resources that is required to operate the system.”²⁸ This might be accomplished by designing based on existing mental models, design layouts, and labeling; or minimizing unhelpful text, images and links. Thoughtful design reduces unnecessary friction, thus minimizing the amount of energy users have expend on a task.

Dark patterns are similar sets of recurring design components but are instead optimized for the benefit of the designer, usually at the direct expense of the user, most commonly in terms of user

²⁵ User Interface (UI) Design Patterns, Interaction Design Found., <https://www.interaction-design.org/literature/topics/ui-design-patterns/>.

²⁶ Christopher Alexander, *A Pattern Language: Towns, Buildings, Construction*. Oxford University Press. (1977).

²⁷ <https://www.designsystems.com/christopher-alexander-the-father-of-pattern-language/>

²⁸ Kathryn Whitenton, *Minimize Cognitive Load to Maximize Usability*. (December 22, 2013). <https://www.nngroup.com/articles/minimize-cognitive-load/>

financial loss or an unwanted expenditure of the user’s money.²⁹ Dark patterns may also require or coerce users to disclose more personal information (violate privacy) or spend more attention or time (maximize engagement) on a website or feature than users would ideally desire. The term “dark patterns” was popularly coined in 2010 by designer Harry Brignull, who described them as “tricks used in websites and apps that make you do things that you didn’t mean to, like buying or signing up for something.”³⁰ More recently, Mathur *et al.* defined dark patterns as user interface design choices that benefit an online service by coercing, manipulating, or deceiving users into making unintended and potentially harmful decisions.³¹ An emerging literature has grown around cataloging deceptive retail practices in e-commerce and documenting dark patterns across additional contexts, such as privacy and online video gaming.³² In recent years, Harry Brignull has opted for the term “deceptive design patterns,” emphasizing the routine manipulation at play. These mechanisms can be *replicated* by several online services and *adapted* into their user flows, depending on the goal of deception. “Dark patterns” or “deceptive design patterns” routinely hinder users’ goals and undermine their choices or individual agency. Collections of examples are available at [Deceptive.design](https://deceptive.design/)³³, Professor Colin Gray’s [UXP² Lab website](https://darkpatterns.uxp2.com/)³⁴, and the [Dark Patterns Tip Line](https://www.darkpatternstipline.org)³⁵, the crowdsourced website that I co-manage.

²⁹ While “designers” (e.g., visual designers or engineers) may be the individuals who actually implement dark patterns in practice, the term is a proxy for whomever or whatever is benefitting from their use. For a discussion of the user’s best interest see Gray 2018. Also, see generally: <https://darkpatterns.uxp2.com/>.

³⁰ Harry Brignull, What are Dark Patterns?, Dark Patterns, <https://deceptive.design/>.

³¹ See: Mathur 2019, 2021.

³² Mathur 2019.

³³ <https://deceptive.design/>

³⁴ <https://darkpatterns.uxp2.com/>

³⁵ <https://www.darkpatternstipline.org>

While dark patterns can be (and often are) intentionally designed to achieve their outcomes, classifying a design pattern as “dark” or “deceptive” does not require proving a designer’s or company’s intent to deceive, coerce, or manipulate the user. It is possible to unintentionally create a dark pattern through poor or sloppy design choices or by not testing or evaluating a design pattern either prior or after launch. Inexperience, or lack of familiarity with established design principles and heuristics can also exacerbate the problem. As such, this report identifies several dark patterns in Match.com’s service and cancellation flow, including:

- Roach Motel: Brignull describes the “roach motel” as when “the design makes it very easy for you to get into a certain situation, but then makes it hard for you to get out of it (e.g. a subscription).”³⁶ Examples of the “roach motel” pattern include requiring customers to cancel “opt out” subscriptions that were billed to them as a default option, as well as the general disproportionality of making canceling a subscription more difficult than signing up for one, often by requiring the customer to call or online chat with a customer service agent instead of providing a simple online option. Match.com attracts users to their subscription services with Guarantee Extensions and emails from “interested” users.³⁷ But, as this report discusses, canceling a subscription proves to be a lengthy process, including extraneous steps, such as a password authentication step and multiple pages of survey questions: this process can take *eight* steps.

³⁶ Brignull, *supra*.

³⁷ This fails to differentiate legitimate and fraudulent communications (users who are under review for fake profiles, soliciting, etc.).

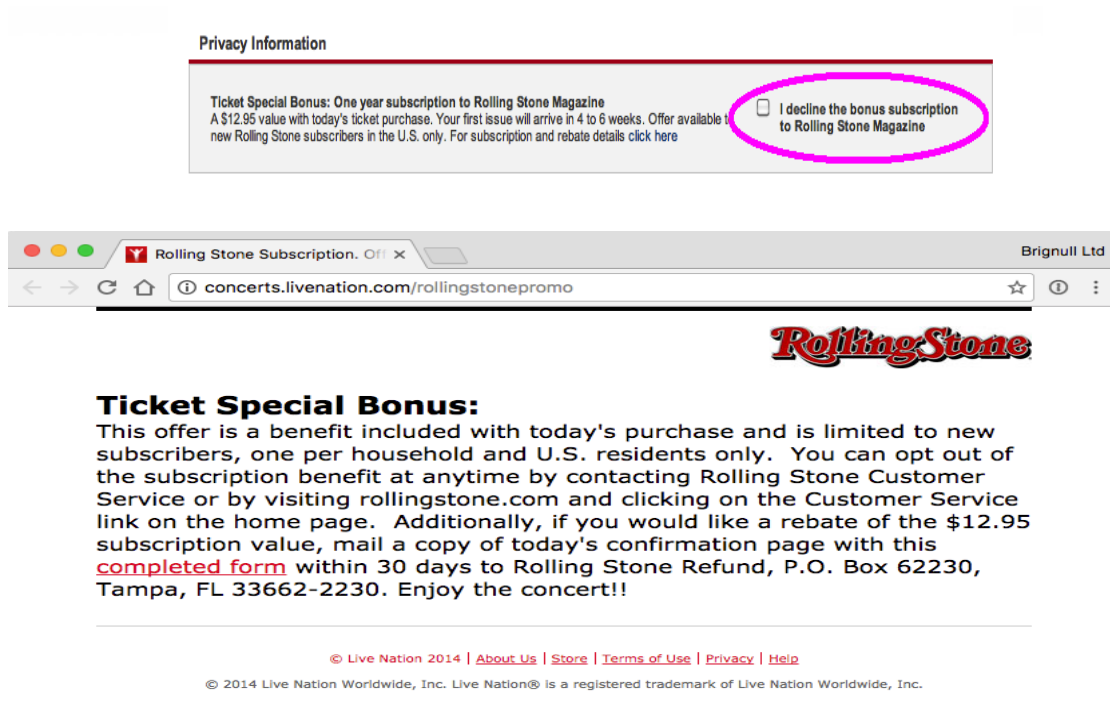


Figure 1: Example of Rolling Stone’s 2014 “Roach Motel” Subscription

Cancellation Process³⁸

- Hidden Information: Match.com frequently hides or fails to disclose relevant information to users. For example, the survey included in the cancellation process is actually optional: it is possible for users to click through the entire process and cancel without providing answers. However, this fact is *never stated* during the cancellation process, nor are users asked if they want to complete the survey. Moreover, statements such as “Tell us more,”

³⁸ Brignull, *supra*.

and “Before you go, help us make Match.com better” lead users to believe the survey is compulsory.

These patterns are classified under a range of strategies identified to harm or deceive users.³⁹

“Roach Motel” is an *obstruction* strategy which makes user tasks more difficult than necessary by adding extraneous barriers and excess friction, such as a password authentication step and surveys.

“Hidden Information” is an *interface interference* strategy which visually manipulates the interface to reduce discoverability of user-desired options. Finally, “Forced Continuity” is a *sneaking* strategy, intended to delay discovery of important information (including information that would cause users to revoke service if presented earlier).

In addition to the questions of conformance to design heuristics described earlier, this report’s analysis draws upon the empirical research literature on dark patterns. This report is framed in this way because while dark patterns do often violate design heuristics, they are not simply isolated issues of poor design by a single company; instead, they fit into the larger instance of dark patterns emerging across multiple sectors of e-commerce companies.⁴⁰ However, the mere fact that multiple companies have engaged in this form of deceptive design does not validate its use or diminish its negative effects on users.

³⁹ Id.

⁴⁰ See generally: Caroline Sinders and Sebastian Rieger, Policy Brief: Dark Patterns - Regulating Digital Design, Stiftung Neue Verantwortung (May 13, 2020), <https://www.stiftung-nv.de/en/publication/dark-patterns-regulating-digital-design/>.

4. Heuristic Analysis of Match.com's Cancellation Flow

This section presents the findings of my heuristic analysis of Match.com's cancellation flow. As introduced in Section 3, a heuristic analysis is an expert review of an interface for conformance with principles of usability and visual design, as well as an assessment from the user's perspective.⁴¹ I start with a descriptive overview of the Match.com cancellation flow for the three dates for which I was provided evidence: 2016, 2019, and 2020, using 2016 as the starting point, and then contrasting that flow with changes introduced in the following years. Next, I describe my findings from the heuristic analysis. I first analyzed the cancellation flow for its conformance with canonical principles of usability and design. I discuss the areas in which I found the flow violated these principles, as well as practitioner design norms (*e.g.*, common best practices for subscription cancellations). Next, I discuss the specific forms of dark patterns I identified in the cancellation flow. Dark patterns are design patterns that violate principles of usability by taking advantage of common biases in human decision-making to manipulate, mislead, confuse, or deceive users. Relatedly, as mentioned earlier in this report, some instances of dark patterns also can include unnecessary or arduous friction into a design pattern and into a design process. Similar to legitimate design patterns, dark patterns have evolved through their adoption and use by companies and designers to become reusable design components or techniques that create decisional interference that benefits the company or designer at the expense of the user. I found multiple examples of dark patterns in the cancellation flow.

⁴¹ Jakob Nielsen, How to Conduct a Heuristic Evaluation, Nielsen Norman Group (Nov. 1, 1994), <https://www.nngroup.com/articles/how-to-conduct-a-heuristic-evaluation/>.

Part of what makes a dark pattern a dark pattern is its subversion of design patterns; design patterns are “are reusable/recurring components which designers use to solve common problems in user interface design. For example, the breadcrumbs design pattern lets users retrace their steps.”⁴² Designers can apply them to a broad range of cases, but must adapt each to the specific context of use.⁴³ Design patterns are a part of the online digital commons; users are taught through the repeated use of design patterns to build a mental model of how a product functions. It’s the subversion of users’ expectations with respect to these common design patterns that creates confusion, manipulation, and deception (*i.e.*, dark patterns).

I conclude this section with a summary of these findings and how they work to create a confusing and friction-filled experience for customers. I also examine supporting documentation from Match.com employees discussing issues with the cancellation provided to me by the FTC.

A. Overview of Match.com Cancellation Process

The FTC’s amended complaint alleges that Match.com has used a “confusing and cumbersome cancellation process that causes consumers to believe they have canceled their subscriptions when they have not” since at least 2013.^{44,45} For my analysis I was provided with recordings and screenshots of the cancellation process from the years 2016, 2019, and 2022. In this section, I will

⁴² Breadcrumbs are “a list of links representing the current page and its “ancestors” (parent page, grandparent page, and so on), typically going all the way back to the site homepage.” <https://www.nngroup.com/articles/breadcrumbs/>

⁴³ <https://www.interaction-design.org/literature/topics/ui-design-patterns>

⁴⁴ First Amended Complaint, p. 2.

⁴⁵ From images in the file MATCHFTC703998, it appears that the cancellation flow screens have been static since at least 2011 based on dates that appear on some screenshots in the file, but given the poor resolution of the images in this file we cannot use it for detailed analysis.

provide an overview of the cancellation process starting in 2016, and then highlight the changes I observed in 2019 and 2022, calling out the specific concerns I have regarding aspects of the cancellation process that could cause customer confusion. Confusion can manifest in many ways, such as customers abandoning the cancellation process before completion, customers misunderstanding the cancellation process and failing to complete it, and customers who seek other means by which to cancel their accounts due to frustrations with the process.⁴⁶ I must note that it appears that the evidence that I have been provided reflects users who had subscribed accounts (rather than customers with free accounts), meaning that there may be steps or menu items that are different for free/non-subscribed users across all three versions I reviewed. All of the evidence I reviewed appeared to be collected on a desktop or laptop computer running Windows; I was not asked to review the cancellation process on a mobile device or operating system, nor to offer an opinion about these processes on mobile devices.

All told, from the initiation step (selecting settings) to the confirmation page, this process typically takes the user at least eight steps:

1. Select Settings icon/click “Settings” link from drop-down menu from Match.com universal site header
2. Land: Account Settings page. Select “Change/Cancel Membership” link.
3. Land: Password entry screen. Enter password and click “Continue Cancellation” button.
4. Land: Page 1 of cancellation flow: Click “Cancel Subscription” from subscription options page.
5. Land: Page 2 of cancellation flow: Survey page S1; click “Continue Cancellation” button.
6. Land: Page 3 of cancellation flow: Retention offer; click “No thanks, I want to resign.”⁴⁷
7. Land: Page 4 of cancellation flow: Survey page S2; click “Continue Cancellation” button.

⁴⁶ Per screenshots provided to me by the FTC, as well as document MATCHFTC703998, other pathways appear to include online chat (within a specific time window) with a customer service agent, or email correspondence.

⁴⁷ It appears that some users may have not received the retention offer page depending upon which survey answer they clicked (i.e., “I met someone”). However, I do not have enough evidence to reliably determine how frequently that occurred.

8. Land: Page 5 of cancellation flow: Cancellation confirmation page.⁴⁸

Table 1: Primary steps in the 2016 Match.com Cancellation Process.

To be clear, these steps do not include any additional tasks presented to users, such as answering all of the survey questions on Pages 2 and 4.

I. 2016 Cancellation Process

The first screen recording of the process provided to me is MATCHFTC761906.mp4, which based on copyright notices viewable on the capture appears to have been recorded in 2016. While some aspects of the site design have changed over time, the core navigation appears to be similar across the years: presumably, accessible from most pages of the website, the universal site header contains an account settings icon (shaped like a gear). When clicked, a submenu appears that contains a link to “Settings;” when clicked, the “Settings” link takes the user to a page entitled “Account Settings.” This page consists of eleven account settings-related links, listed in alphabetical order, as well as navigation “breadcrumbs” viewable at the top of the page beneath the main navigation banner and the native ad banner that indicate which page of the Account Settings one was visiting, which is consistent through the remainder of the flow.

⁴⁸ In MATCHFTC703998, which appears to be a guide for customer service agents dated 11/10/2015, the cancellation process is documented as taking 11 steps.

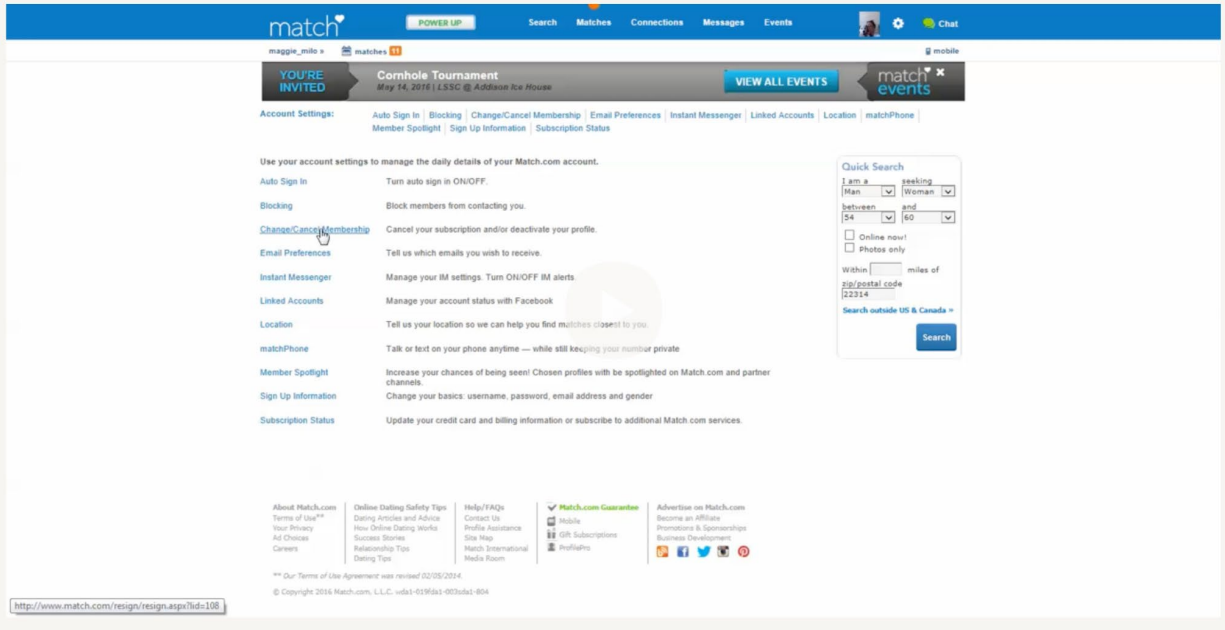


Figure 2: 2016 Account Settings Page

On this page, one first can access the “Change/Cancel Membership” link (third item in the list), with the text “Cancel your subscription and/or deactivate your profile,” which initiates the cancellation flow. After locating the link, when clicked, the user is shown a password entry screen, which requires the user to enter her password before proceeding in the cancellation flow.

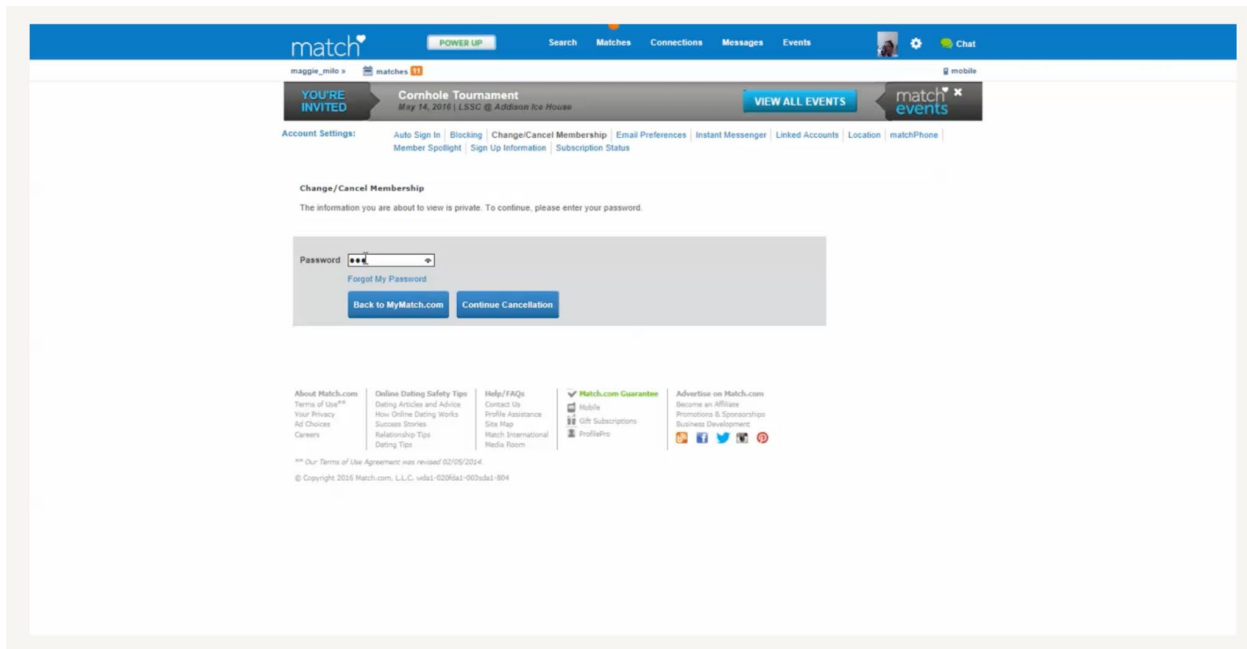


Figure 3: 2016 Password Authentication Page

The breadcrumbs update to show the “Change/Cancel Membership” link in a non-selectable state to indicate which portion of Account Settings the user is presently visiting. If the user successfully enters her password, she then lands on the first page (Page 1) of the cancellation flow: a subscription options page with three choices: “Subscription Status,” “Cancel Subscription” or “Back to MyMatch.com” This page features the first instance of a dark pattern that persists into the 2022 cancellation flow: only the “Back to MyMatch.com” link is rendered as a button, with the same blue button styling present throughout the rest of the cancellation flow. The “Subscription Status” and “Cancel Subscription” links are rendered as blue hyperlinks in text above; their lack of button design makes it harder to spot the “Subscription Status” and “Cancel Subscription” choices.

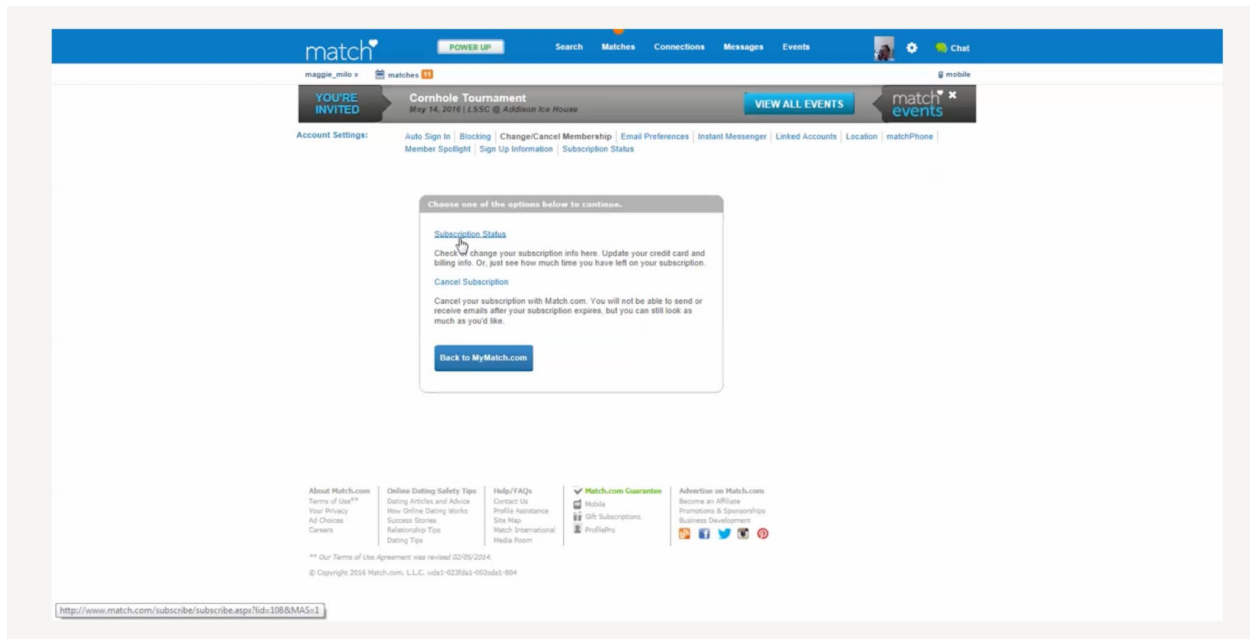


Figure 4: Page 1 of the 2016 Cancellation Flow

If the user identifies “Cancel Subscription” as a clickable element and clicks it, she then lands on Page 2 of the flow, which features a survey question beneath the headline, “Before you go, help us make Match.com better.” There are eight survey answer options on this page, selectable with a radio button. The survey answers are not indicated as optional, though it is possible based on actions documented in Match Cancellation Process_10-12-2022.wmv that one can simply ignore the survey questions and proceed with the cancellation by clicking the “Continue Cancellation” button beneath the survey answers, which I will discuss later. Selecting any of the answers will auto-generate between one to two additional survey questions, again presented with radio buttons and not indicated as optional, for a minimum of at least four throughout the entire survey portion. Beneath the survey answer options are two buttons, each blue, the left button labeled “Back to MyMatch.com,” the right labeled “Continue Cancellation.”

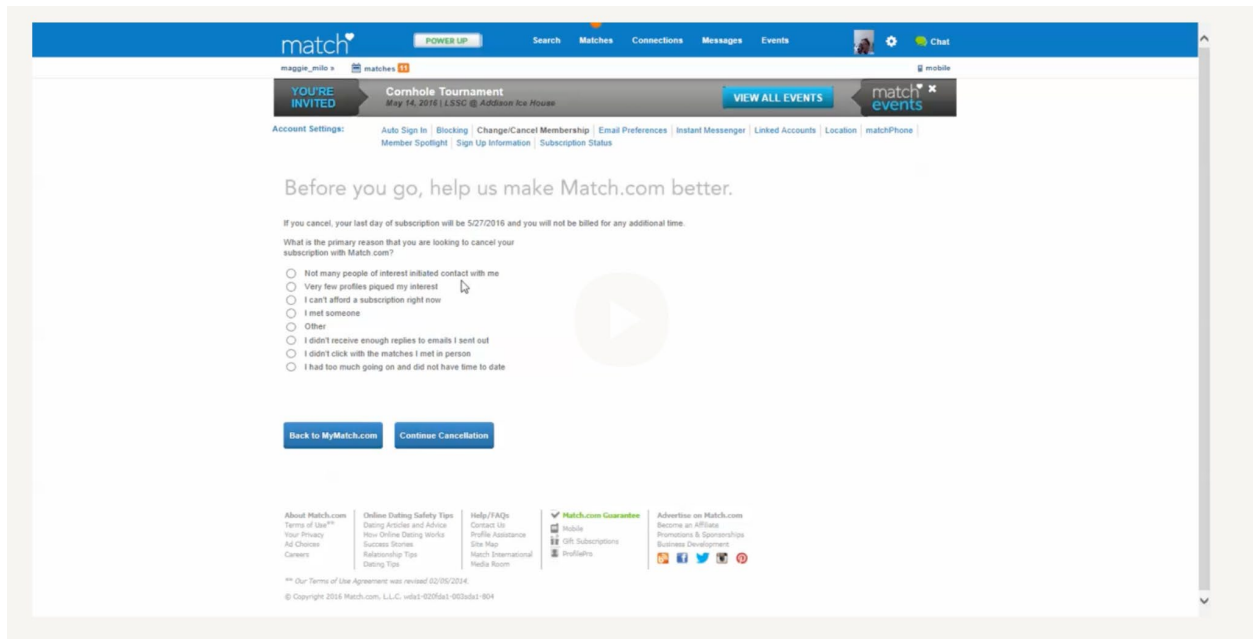


Figure 5: Page 2 of the 2016 Cancellation Flow

Once the user clicks the “Continue Cancellation” button, she is taken to Page 3 of the flow, a marketing page, where the user is given a retention offer. In the 2016 version, the options at this stage were “GET 3 MORE MONTHS” (displayed as a blue clickable button) or “No thanks, I want to resign” displayed as a blue text hyperlink. Notably, this button differs from the other buttons in the flow both in shape (oval, versus rectangular), styling (a different, new shade of blue for the background, the shadow which gave the previous button a more ‘3D’ or physical feel is now removed, and a new font style and new darker color for the font and text is also used) and in labeling (using all-caps instead of lowercase). There is also no headline on this page. In order to proceed with cancellation, the user must click the “resign” hyperlink, which lands on a second survey page, entitled “Tell us more.” I will discuss the issues with these inconsistencies and the use of the hyperlink below.

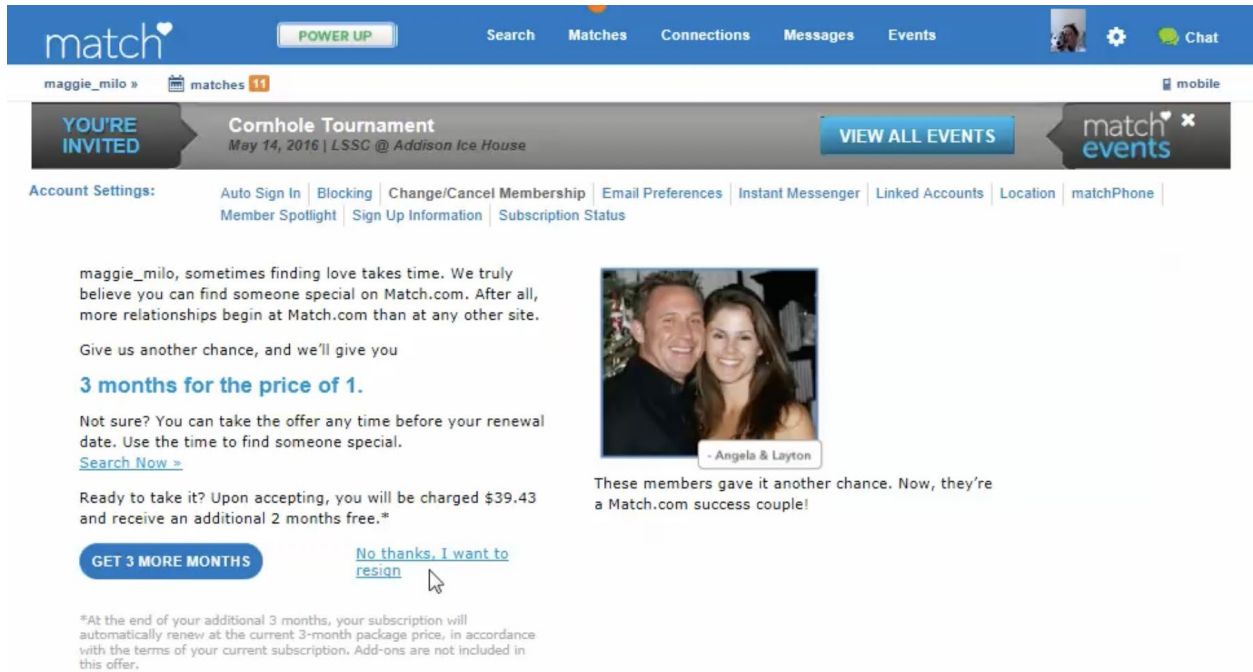


Figure 6: Page 3 of the 2016 Cancellation Flow.

On the 2016 version of this next page, the user is presented with the question “In your own words, how can we make finding love easier?,” with an open-response text box that allows for the entry of 1000 characters of text. This page now returns to the original design of the cancellation flow, with the buttons changing back to rectangular boxes, the original styling, and original wording. Beneath are two new survey questions, a write in question of “How likely is it that you would recommend Match.com to a friend?,” with a Likert-scale survey answer widget underneath it, numbered 1-10, with radio button selectors to pick choices on a scale from “Not Likely” to “Very Likely.” Beneath this widget, there is text informing the user of the benefits she will lose by

canceled.⁴⁹ Beneath this are two blue buttons, identical to the buttons on Page 2 of the flow. Clicking “Continue Cancellation” lands the user on Page 4 of the flow, the cancellation confirmation page. This page features a headline, “Your subscription has been canceled.”, provides a confirmation number for the user, and indicates the last day the user’s subscription will be active.

match **POWER UP** Search Matches Connections Messages Events Chat

maggie_milo » matches 11

YOU'RE INVITED **Cornhole Tournament** May 14, 2016 | LSSC @ Addison Ice House **VIEW ALL EVENTS** **match events**

Account Settings: Auto Sign In | Blocking | Change/Cancel Membership | Email Preferences | Instant Messenger | Linked Accounts | Location | matchPhone | Member Spotlight | Sign Up Information | Subscription Status

Tell us more.

In your own words, how can we make finding love easier?

1000 characters remaining

How likely is it that you would recommend Match.com to a friend?

◀ Not Likely Very Likely ▶

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
0	1	2	3	4	5	6	7	8	9	10

If you cancel now, you will lose these benefits once your subscription ends:

- You won't know [who's viewed your profile](#)
- No more [sending and responding to emails](#)
- You risk losing your current [monthly rate](#)

Back to MyMatch.com **Continue Cancellation**

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** Our Terms of Use Agreement was revised 02/05/2014.

Figure 7: Page 4 of the 2016 Cancellation Flow.

⁴⁹ Each bullet point includes blue text that appears to be hyperlinks, but I did not see video evidence that demonstrated whether these were in fact links, and where they led if clicked.

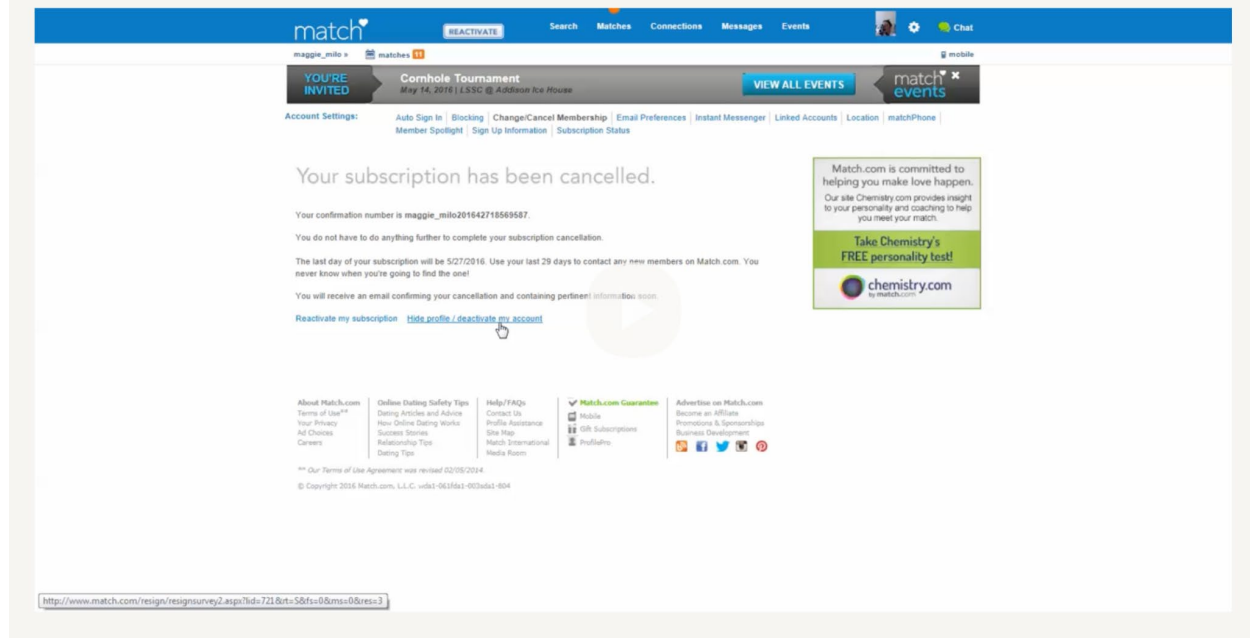


Figure 8: 2016 Cancellation Confirmation Page

II. 2019 Cancellation Process

The next version of the cancellation process for which I was provided documentation is from 2019.⁵⁰ In this section, I will review the substantive changes between this version and 2016; the number of primary steps from selecting Settings to the confirmation page remain the same (typically eight steps).

While the look and feel of the Match.com site was updated since 2016, the primary steps and screens remain intact with some substantive changes. The first substantive change is a redesign of Step 3, the password entry screen. While the previous version was primarily text-based and used

⁵⁰ MATCHFTC672309.mp4

the same blue buttons viewable later in the flow (including a “Continue Cancellation” button), the new version introduces new graphical design elements and includes a CAPTCHA widget, which if invoked by the system can add an additional step of completing the CAPTCHA image selection task. This new design element appears to obscure the Account Settings breadcrumbs (navigation elements) that are still observable on subsequent pages at the top of the page beneath the main navigation banner and the native ad banner that indicated which page of the Account Settings one was visiting.

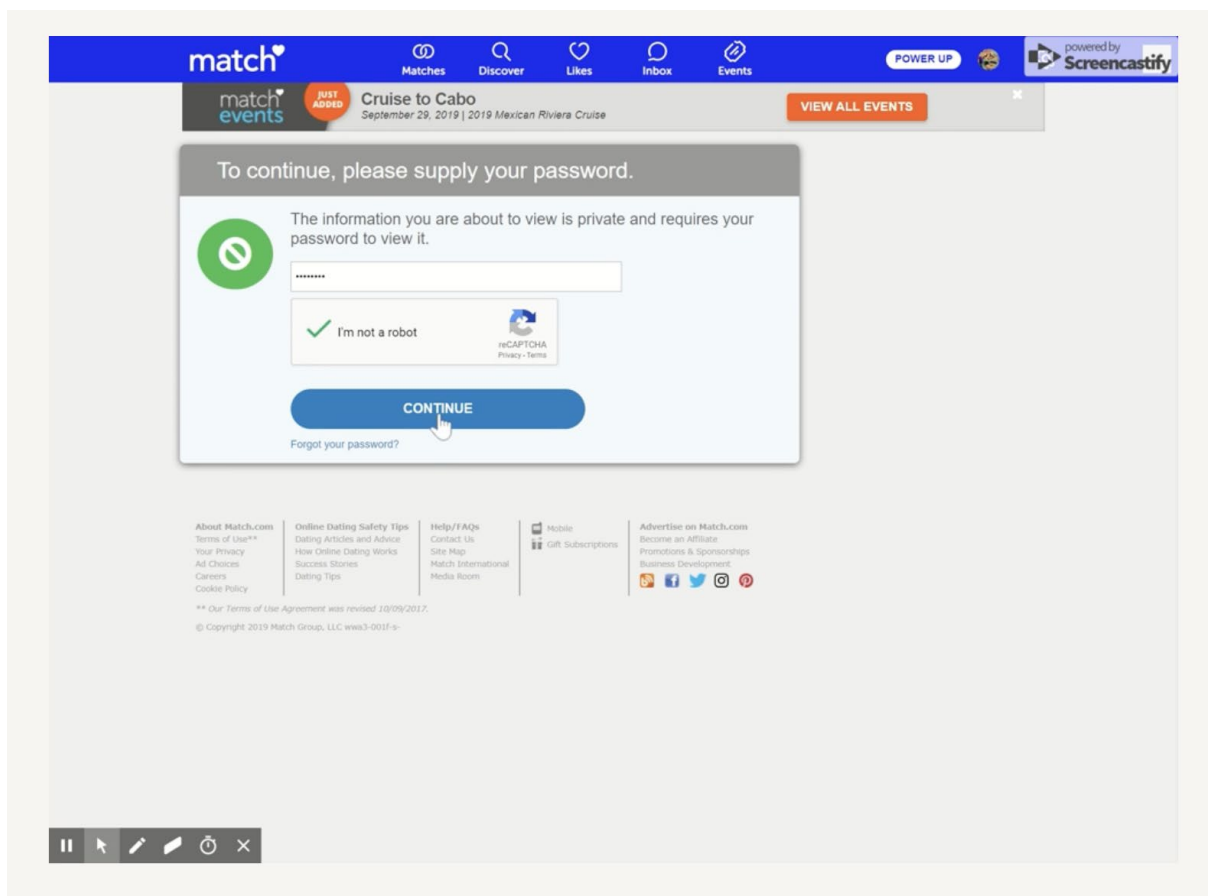


Figure 9: The 2019 Password Authentication page

The second substantive change is on Page 3 of the cancellation flow, the retention offer. Here, the “No thanks, I want to resign” text link has been replaced with a button; now, there are two buttons, the left button with the current offer (“GET 50% OFF 6 MONTHS”), and “CONTINUE CANCELLATION.” Again, as in 2016, these buttons are stylistically different from the blue buttons used elsewhere in the cancellation flow.

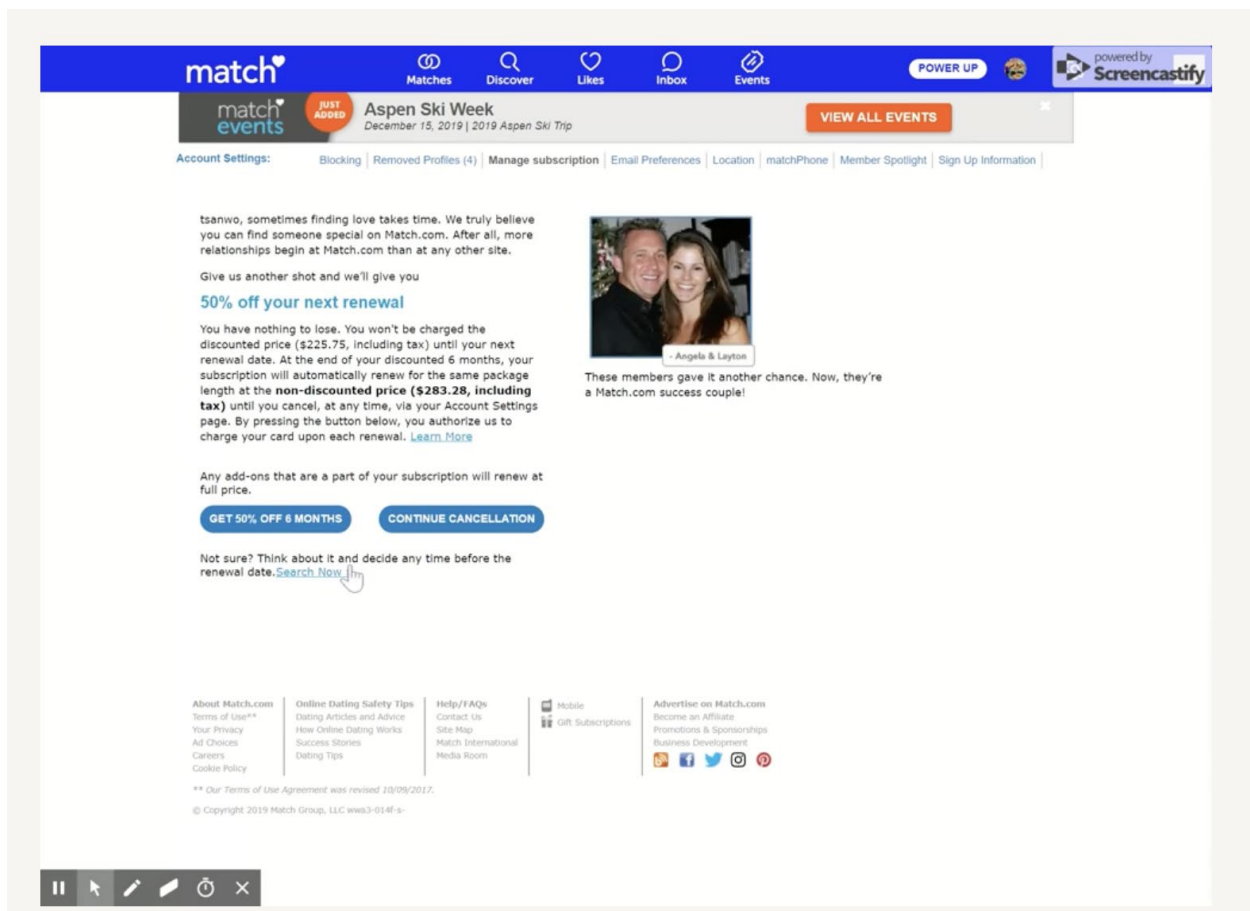


Figure 10: 2019 Retention offer page (Page 3)

The third substantive change is on Page 4 of the cancellation flow, where the “In your own words, how can we make finding love easier?” question and open-response text box have been removed, leaving the Likert-scale survey answer widget and accompanying question.

III. 2022 Cancellation Process

The final version of the cancellation process for which I was provided documentation is dated 2022.⁵¹ In this version, the Match.com website’s visual style has undergone additional updating; The Account Settings page is redesigned, with eight menu options instead of the previous eleven. The “Change/Cancel Membership” has been removed; “Manage Account” is the replacement, first in the list, with a “Manage Subscription” link beneath. The breadcrumb-style navigation has been replaced by a split-screen design with the menu options running along the left side of the screen. While these options appear to be persistent for some of the menu items, when one clicks the “Manage Subscription” link, this split-screen design disappears and subsequent pages in the flow lack either breadcrumbs or the split-screen menu items.

⁵¹MATCHFTC672321.wmv; Match Cancellation Process_10-12-2022.wmv.

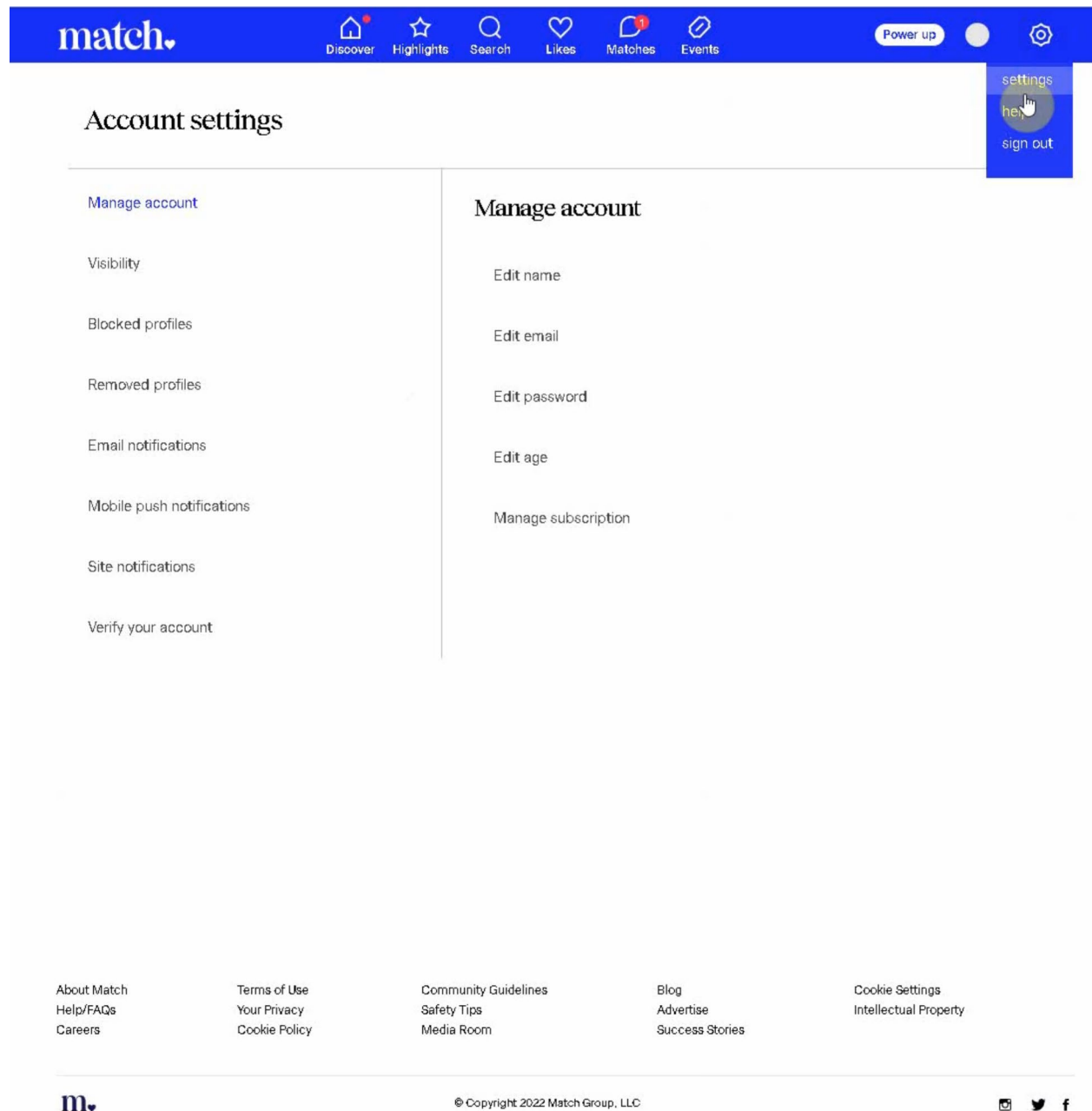


Figure 11: 2022 Account Settings page

B. Analysis of Cancellation Process

The FTC’s amended complaint alleges that the cancellation process “causes consumers to believe they have canceled their subscriptions when they have not.” Upon reviewing the multiple iterations of this cancellation process, I believe this conclusion is supported by both the website evidence and the company documents I reviewed: the cancellation process caused substantial confusion for many consumers. Additionally, I expect that some customers found the cancellation flow frustrating enough, or were stymied by the password authentication step, that they were compelled to contact Match.com’s customer service in order to cancel their subscriptions, which could add additional time or complexity to the process. In this section, I review the factors that I believe caused this confusion.

I. Violation of Usability Heuristics

The Match.com cancellation flow across the three versions I reviewed violates several of the principles of website usability, as proposed and refined by Dr. Jakob Nielsen,⁵² in a manner that could lead to customer confusion. The issues I review here are compounding, meaning that any single one in isolation may not have been enough to cause substantial confusion, but additively working in tandem, all contribute to a lack of clarity about how to successfully cancel one’s Match.com account.

a. Visibility of System Status

Nielsen defines this principle as: “The design should always keep users informed about what is going on, through appropriate feedback within a reasonable amount of time.” I observed a violation

⁵² Jakob Nielsen. “10 Usability Heuristics for User Interface Design.” Nielsen Norman Group, April 24, 1994 (Updated Nov. 15, 2020). <https://www.nngroup.com/articles/ten-usability-heuristics/>. Based on: Nielsen, J. (1994). Enhancing the explanatory power of usability heuristics. Proc. ACM CHI’94 Conf. (Boston, MA, April 24-28), 152-158.

of this principle in the cancellation process from a lack of consistent signaling to the user each step in the cancellation process and her present place within those steps. While the 2016 and 2019 versions use breadcrumb navigation to indicate to users that they remained in the cancellation flow throughout the process, breadcrumbs were eliminated in the 2022 version I reviewed. However, the existence of breadcrumbs alone aren't necessarily a guarantee that all users will clearly understand the current step they are in, especially given a lack of labeling of steps in the cancellation process across all versions. All versions lack a simple, clear label (e.g., "Step 3 of 5," "Page 4 of 6") indicating to users precisely where they are in the process, and this is not a problem that breadcrumbs alone can solve. The only other signal is the presence of a "Continue Cancellation" button on most, but not all, pages. The elimination of breadcrumbs from the 2022 version, coupled with a lack of discrete steps, means that a user can be several steps into the laborious cancellation process and struggle to understand what remains, or whether they are still in the cancellation process at all given its inconsistency. I will discuss this in more detail below.

b. Consistency and Standards

Nielsen describes consistency as: "Users should not have to wonder whether different words, situations, or actions mean the same thing. Follow platform and industry conventions." The Match.com cancellation process violates this principle in several ways. The primary example is on Page 3, the retention offer page. Across the three versions of the flow, this page stands out for its inconsistency with the pages before and after it; it appears to be using a different stylesheet to render the buttons on the page, which are designed and labeled differently from the other pages, as it also lacks a page title. The experience is such that it appears to be an advertisement inserted into the cancellation process, rather than an actual step in the process itself. As a consequence,

some users may have become confused and assumed that they had left the cancellation process when arriving on this page, abandoning the flow.

The lack of “Continue Cancellation” button on the 2016 version of this page (Figure 6) is also egregious, especially given the use of such a button the preceding and anteceding pages as the only means of signaling continuity in the process; the use of a text link and the “resign” language undoubtedly caused substantial confusion to consumers, which I will discuss in more depth later in this report. I see this mixing of links and buttons on page 1 (Figure 4) as well, where the primary tasks on this page (Subscription Status and Cancel Subscription) are links that could easily be confused as headers, while the only button on the page (the primary call to action) takes the user back to MyMatch.com. Another consistency issue, which I will expand upon later, is the use of password authentication for access to the subscription cancellation flow. Beyond the initial website sign-in, which Match.com customers may have been able to stay signed-in to their accounts for extended periods of time, it does not appear from my review of the evidence that any other portion of the website after the user initially logged in required password authentication other than the subscription cancellation flow. The arbitrary placement of a password authentication mechanism at this specific point, and not at other points on the website where sensitive information could be accessed and changed without the account holder’s knowledge, suggests that the password authentication was placed at this point as an obstacle for users to access the cancellation flow. (I discuss the password authentication step in more detail below.)

c. Aesthetic and Minimalist Design

Finally, Nielsen describes this final principle as: “Interfaces should not contain information that is irrelevant or rarely needed. Every extra unit of information in an interface competes with the

relevant units of information and diminishes their relative visibility.” The Match.com cancellation process violates this principle by inserting extraneous, unnecessary steps, making it far longer than necessary and subjecting its users to excess interactions that increase their cognitive load and makes it more likely that users will abandon their task mid-flow. The insertion of both the survey flow, as well as the retention offer, directly into the cancellation flow adds extraneous, unnecessary information and steps that could have easily been placed after the completion of the cancellation step, or designed in a way that could have been less taxing.

Another way the cancellation flow violates this principle is through introducing excess *friction* to the flow, which causes excessive cognitive load for users. As discussed in Section 3B. Heuristic Analysis, friction refers to “interactions that inhibit people from intuitively and painlessly achieving their goals within a digital interface.” Other experts have noted how some elongated flows create friction, for example in this paper analyzing unnecessary friction in cookie banner consent design: “While two different screens may not seem frictive (increasing friction), this flow is a dark pattern because of the lack of cues within the user interface to show the user which choices they have made, combined with a multi-step process.”⁵³ There is a similar kind of friction/frictive element present in the Match.com cancellation flows; various expert best practices for cancellation flows have recommended making surveys optional,^{54,55} not forcing users to fill out a survey to

⁵³<https://www.gmfus.org/sites/default/files/Sinders%2520-%2520Design%2520and%2520Information%2520Policy%2520Goals.pdf>

⁵⁴<https://www.campaignmonitor.com/blog/email-marketing/find-out-reasons-for-unsubscribing-with-a-quick-exit-survey/>

⁵⁵https://medium.com/@the_manifest/9-tips-for-compelling-email-unsubscribe-pages-e2e8cae01c8f

unsubscribe^{56,57} and to create very short, one question surveys.^{58,59} Design expert Luke Wroblewski, in his work on forms and similar multi-step processes, notes that “[t]o keep people focused on completing a form, you also should consider which Web site elements help illuminate a clear path to completion and which elements distract from it...[r]emoving interface elements not directly related to completing a form helps keep people on task and removes paths to abandonment.”⁶⁰ By inserting 2-3 additional steps on new pages, as well as adding a password authentication step, Match.com increased friction and created barriers to the cancellation process, breaking established cancellation and design flow norms as argued in this section and above.

II. Dark Patterns in the Cancellation Process

In addition to violating the design principles described above, I found several examples of dark patterns in the cancellation process. In this section I will review each type of dark pattern observed, where I identified it in the process, and when. It is important to note that dark patterns are not

⁵⁶ https://medium.com/@the_manifest/9-tips-for-compelling-email-unsubscribe-pages-e2e8cae01c8f

⁵⁷ <https://www.litmus.com/blog/the-dos-and-donts-of-unsubscribes/>

⁵⁸ <https://ux.stackexchange.com/questions/17054/should-survey-for-canceling-subscription-be-before-or-after-the-subscription-is>

⁵⁹ <https://mailchimp.com/en-gb/help/edit-or-remove-the-unsubscribe-reason-survey/>

⁶⁰ Luke Wroblewski. Web Form Design: Filling in the Blanks. Rosenfeld Media: 2008.

Dark patterns on this page

1. This retention offer reads as an ad, and is different from the previous cancellation flow (this is a form of dark pattern called "Obstruction.")
2. Different design, layout and copy
3. Buttons change design in shape
4. Buttons change color
5. Buttons change copy
6. One button is removed; one button is left that reads "Get 3 More Months"
7. "I want to resign" is hyperlink (the use of a hyperlink instead of button is a documented dark pattern called "Denied Choice")
8. "I want to resign" does not say cancel; confusing language

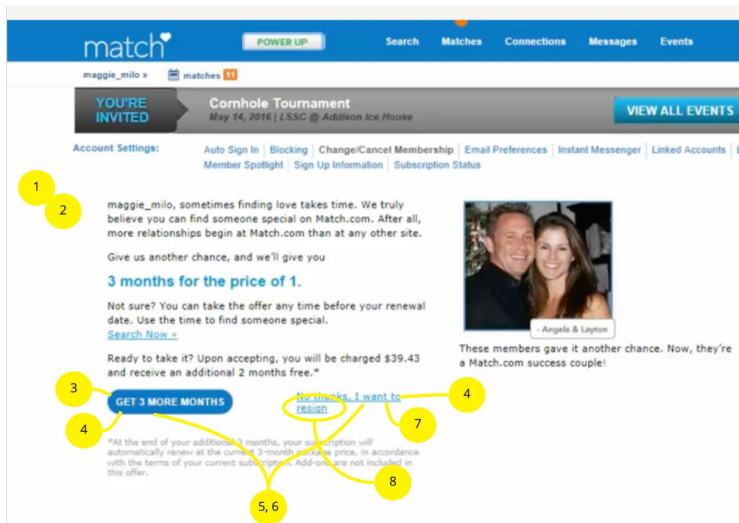


Figure 12: Identification of dark patterns on the 2016 retention offer (Page 3)

mutually exclusive; a feature (e.g., the survey in the cancellation flow) may utilize more than one dark pattern in its design.

a. Obstruction

Obstruction is defined as “Making a process more difficult than it needs to be, with the intent of dissuading certain action(s).”⁶¹ Brignull identifies a specific form of obstruction, the “roach motel,” where “the design makes it very easy for you to get into a certain situation, but then makes it hard for you to get out of it (e.g. a subscription).”⁶² Obstruction can also be described as the inappropriate use of friction, as I discussed earlier, where additional steps or features require additional effort by users, increasing cognitive load, time spent, and making it difficult, if not impossible, for some users to complete the process. Obstruction was used throughout the entire

⁶¹ Gray 2018, Mathur 2019.

⁶² Brignull, *supra*.

cancellation process, making it longer and more complex than needed, and contributing to user confusion and task abandonment. I observed it at the following points:

- The password authentication requirement at the start of the process. As I discuss in more detail later in this section, this authentication screen appears to have been arbitrarily placed at this point in the flow. Given the comparative lack of risk to the user of a negative impact from an adversary accessing the account for this function as compared to other account functions that were not restricted by authentication, it is difficult to justify why password authentication was necessary at this step. Based on literature from computer security experts and practitioners, the context in which Match.com deploys password authentication bars users from accessing settings on their account that should be readily available.
- The inclusion of survey questions in the process. As I discussed above, peppering survey questions throughout the flow, as well as not indicating that the questions are optional, is a violation of cancellation best practices. A more appropriate point for Match.com to survey its customers would be on the cancellation confirmation page, or in a post-cancellation email, and to make it clearly optional. The inclusion of the survey questions throughout the cancellation flow wastes users' time and increases their cognitive load.
- Inconsistent design throughout the process. As I discussed earlier, the lack of consistency in design throughout the flow makes it difficult for users to understand where they are in the cancellation process and what steps are required in order to complete it. This was particularly apparent on Page 3, the retention offer page.

b. Forced Action

Forced action is the practice of “requiring the user to perform a certain action to access (or continue to access) certain functionality.”⁶³ What makes an action forced is that there is weak, or zero, justification for the user to take the action; the point is to make the action egregious or laborious enough to disincentivize the user to complete their task. Forced action (as well as obstruction) can enable forced continuity by making it difficult to impossible for users to accomplish the goal of canceling a subscription.

There are multiple examples of forced action in the cancellation process:

- The password authentication page: as discussed earlier and in more detail later in this section, the password authentication step appears arbitrarily placed in relation to other options with access to vulnerable information. Users who did not remember their passwords were prevented from accessing the cancellation flow until they found or reset their passwords. This requirement introduces delay into the process, which can vary by user and the complexity of the password reset process, though among less sophisticated users the process of resetting a password could introduce significant delays and thus prevent them from returning to the cancellation task.
- Inserting survey questions on pages 2 and 4: again, because it was not obvious to users that the survey questions were optional, users were likely to believe that they were required to answer these questions in order to proceed with cancellation. The use of radio buttons as the interaction mechanism reinforces this expectation, as radio buttons are typically presented as an element that must be filled out and selected before moving forward in the

⁶³ Gray 2018.

user flow (a practice that is appropriate for surveys in other contexts where a user **must** fill out each question to get to the end of survey). That nearly every option on page 2 spawned additional questions after selecting an initial response likely led many users to believe they had to answer every question asked of them. This feature also introduces uncertainty—how many new questions will continue to spawn after every answer I select? The dread of possibly spawning more and more questions presents a significant disincentive from continuing the cancellation flow. Again, these multiple questions, instead of one question, breaks the norm of cancellation flows. The open text response field on page 4 of the 2016 version of the flow would also have posed a challenge for users who were inexperienced with such questions or for whom writing responses was a challenge. This field also included a character count (maximum 1000), that some users could misinterpret as a requirement rather than a limit, or as a required number of words rather than characters. Combined with the lack of signaling regarding the number of steps required for users to cancel across all years of the flow I analyzed, the prospect of being forced to answer multiple survey questions across multiple pages would have negatively impacted the experience for many users and led to their abandoning the cancellation flow.

c. Hidden Information

Match.com frequently hides or fails to disclose relevant information to users. Hidden information is defined as “options or actions relevant to the user but not made immediately or readily accessible.”⁶⁴ I observed at least two examples of hidden information:

⁶⁴ Gray 2018.

- Representing the optional surveys are required: the survey questions presented on Page 2 (Survey S1) and Page 4 (Survey s2) appear required but are actually optional. It is possible for users to click through the pages and cancel without providing any answers. However, this fact is *never stated or signaled* in the cancellation process, nor are users asked if they want to complete a survey. Moreover, statements such as “Before you go, help us make Match.com better” and “Tell us more” would lead some users to believe the survey is compulsory or necessary for cancellation.⁶⁵ Later, I compare Match.com’s user flow to Facebook Dating, which presents its survey as optional and bypassable with the inclusion of a “Skip” text button. As mentioned above, design experts have recommended cancellation surveys be optional; users should be notified, either using language or design, that the survey they are filling out is optional, which Match.com failed to do.
- Findability of cancellation process: finding the means to cancel on the website was not a simple task. There appears to be a single pathway to start the process (as outlined in Table 1), which means that failure rates could be high if users did not discover it.⁶⁶ While the placement of the gear icon in the universal header adheres to accepted design practices, the use of the term “settings” in the drop-down menu is ambiguous and required exploration by users to encounter the Account Settings option; then, on the Account Settings page, there is no mention of cancellation, but instead the term “Manage Subscription,” which again doesn’t mention cancellation: “Update your membership and/or deactivate your

⁶⁵ While some users may have felt compelled to click through the process to “submit” the survey, others may have found the use of the “Before you go” language on Page 2 (Survey S1) confusing to the point of suggesting that this page was the “final” cancellation page, and that Page 3 was an optional retention offer that didn’t require clickthrough. Please see Section 4.II.D.2, “Confusing Terminology,” for details. It is important to note that these interpretations are not mutually exclusive; both pose possibility for user confusion.

⁶⁶ There is a link within the Canceling help page that appears to deposit the user at the password authentication stage of the cancellation process. I have not observed any other direct links to the process in the materials I reviewed.

profile” in 2019 and earlier, “Manage Account” and then “Manage Subscription” on the 2022 version. Furthermore, the site’s help pages also buried information about membership cancellation; the Manage My Subscription help page doesn’t display the “Canceling” page unless the user clicks on a “See all articles” link, which then displays the full list of articles with “Canceling” at the very bottom. The help page also directs the user to the online process, and does not suggest that users contact an agent except in the context of canceling a free trial.

d. Content Strategy

The software product design process does not just consist of user research, engineering, or user experience (UX) design/graphic design. It also includes content strategy and copywriting. Content strategy and copywriting refer to the actual language and word choices within a software application (app) or product. Words, names and descriptors are as intentional, and planned as the design and coding of the app itself. It is crucial to analyze the language used within the Match.com cancellation flow in order to understand how it contributed to any user confusion, along with the frequency of the language/naming of the particular cancellation copy/content strategy choices and descriptions and the design and interaction patterns changes. All of these language choices (the content strategy and copywriting of the cancellation user flow) contributed to user confusion within the cancellation flow. I must emphasize that while the following section just focuses on content strategy, all of the below examples also coincided with graphical user interface changes, and these changes must be viewed together to understand the wider impact of the dark patterns and confusing elements within Match.com’s cancellation flow. The following paragraphs will focus specifically on the content strategy choices made by Match.com from 2016-2022.

1. Inconsistent Language

As mentioned earlier throughout this report, consistency is not only a tenet of good design,⁶⁷ it is a practice taught to designers, technologists and product managers. Consistency refers not just to consistent design choices, but also content strategy and copywriting, including use of language, voice, tone, and word choices. Consistency refers to internal consistency for employees and external consistency for users.⁶⁸ From 2016-2022, Match.com used inconsistent language throughout the cancellation process, particularly on page 3, the ‘retention offer page’ (Figure 6 for 2016, Figure 10 for 2019, Figure 13 for 2022). As highlighted above, the retention offer page from 2016-2022 changes visual design, UX design (page layout) and content strategy and copywriting design (language choices, tone and voice, etc.). Starting with 2016, the retention offer page shifts in tone and voice from the page previous, switching from third person to first person. Nowhere in the cancellation flow to this point has the “I” voice been used, but between page 2 and page 3 the button choices change from “Back to MyMatch.com” and “Continue Cancellation” to “Get 3 More Months” and the “No thanks, I want to resign” link.

⁶⁷ Nielsen 1994.

⁶⁸ <https://uxdesign.cc/design-principle-consistency-6b0cf7e7339f>

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Figure 13: Retention Offer from 2022, Match Cancellation Process_10-12-2022.wmv

The 2019 process features two different retention offer pages with one flow in 2019, captured from F01-MG-0028904.webm, that shows the retention offer page uses “Continue” instead of “Continue Cancellation.” Previous pages from F01-MG-0028904.webm use “Continue Cancellation,” with the retention offer page switching to “Continue” with previous and subsequent pages switching back to “Continue Cancellation.” However, the other flow from 2019, captured from MATCHFTC672309.mp4, and documented in 2022, show the retention offer page, has changed to include “Continue Cancellation” as a button, which is consistent, but the rest of the copy, design

and images on the retention offer page is still similar, if not identical, to 2016, which again demonstrates a discontinuity in tone from the preceding and following pages. The copy on the retention offer page is similar to an ad, or coupon, and while it does mention cancellation, its tone shifts from survey style language to friendly ad copy, and then back to the survey tone on the following page.

Shifts in tone are forms of inconsistency; certain parts of a website, such as the landing page, might use a more personalized or friendly voice for new and returning users, while other parts of a website, such as a cancellation flow or a sign up flow, might use more general, and straightforward language. Specifically, different tones can signal different actions, or different parts of a website or product. Shifting tones within a specific flow, such as signing up or canceling, breaks ‘consistency’ and leads to confusion; for example, did the user accidentally click somewhere on the navigation and exit the flow they were in, or did they accidentally click on an ad? Consistent content strategy helps guide, ground, and place a user in a process, particularly as they are actively navigating a process, such as changing a feature or setting, or removing or deleting content or subscriptions. Relatedly, the kind of tone and language used by the retention offer page, which is different from the tone and language used in the rest of the cancellation flow, is an example of a dark pattern as ‘confirmshaming.’ Confirmshaming is defined as: “the act of guiltting the user into opting in to something. The option to decline is worded in such a way as to shame the user into compliance. The most common use is to get a user to sign up for a mailing list, and it is often found in exit intent modals and other popups.”⁶⁹ Other experts describe ‘confirmshaming’ as “using

⁶⁹ <https://www.deceptive.design/types/confirmshaming>

language and emotion (shame) to steer users away from making a certain choice.”⁷⁰ For example, delish.com, an online food and lifestyle service, offers users to sign up for their email list; the option to decline (“No thanks, I’ll have a microwave dinner tonight”) is framed as inferior and undesirable compared to the option to accept (“Show Me 14 Simple Dinners”).⁷¹

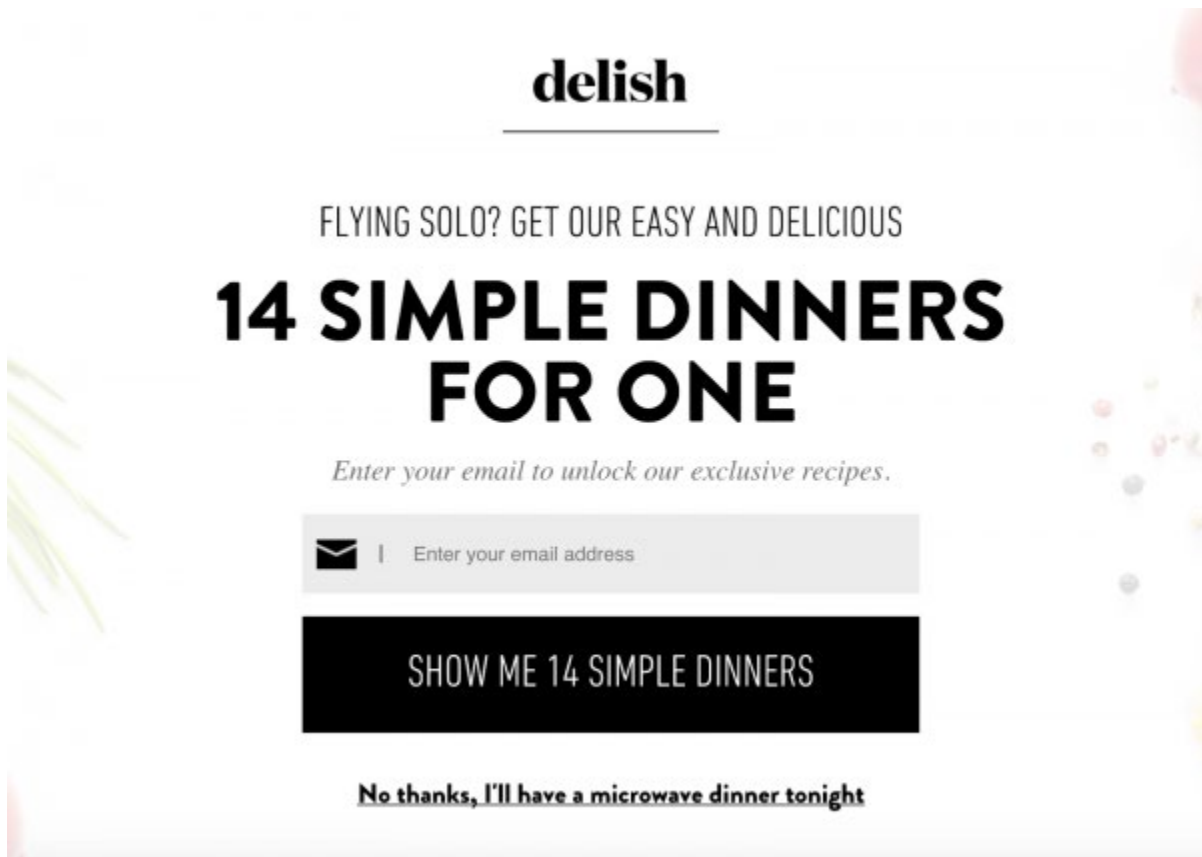


Figure 14: Delish.com using Partial Language to Discourage “Opt-Outs”

Based on Figure 6 (Page 3 of the 2016 Cancellation Flow), Match.com also used a dark pattern called “confirmshaming” in their retention offer: “[User Name], sometimes finding love takes time. We truly believe you can find someone special on Match.com. After all, more relationships

⁷⁰ <https://arxiv.org/pdf/1907.07032.pdf>

⁷¹ Eric Shroeder, “UX Dark Patterns: Manipulinks and Confirmshaming.” *UX Booth*. (June 4th, 2019). <https://www.uxbooth.com/articles/ux-dark-patterns-manipulinks-and-confirmshaming/>

begin at Match.com than any other website. Give us another shot and we'll give you _____ off your renewal.”⁷² Additionally, an image of a couple is shown with the caption: “These members gave it another chance. Now they are a Match.com success couple!” The presentation of a ‘successful couple’ is questionable as a user may be canceling their subscription for any number of reasons, including having established a ‘successful’ relationship since starting Match.com. The usage of the confirmshaming along with the abrupt tonal shift from the rest of the cancellation flow, only heightens the inconsistent language which in turn can add to user confusion. Match.com’s own employees also appear to have found similarly; in document MATCHFTC320168_image.pdf, page 1 notes that employees described the 2016 flow’s verbiage as ‘inconsistent’ and the retention offer as ‘misleading.’

2. Confusing Terminology

As mentioned above, Match.com repeatedly used inconsistent language and tone across the cancellation process. But the company also used confusing terms (copy) throughout the cancellation process as well. For example, in 2016, on the retention offer page, Match.com uses the phrase “No thanks, I want to resign.” Prior to this page, the cancellation flow has not used ‘resign’ at all, but instead has used ‘cancel’, ‘cancellation’ and ‘canceling.’ Match.com employees have referred to the cancellation process as ‘resignation process’ and have highlighted the flow itself is confusing to users.⁷³ The use of the term “resignation” in the retention offer leads to further confusion for users, as it has never been used in the cancellation process until this point, and is not used again on subsequent pages. A review of screenshots of the Match.com help pages provided

⁷² MATCHFTC761906.mp4; Please note that the renewal offer is ‘3 months for the price of one’ instead of a percentage off. All of the other documentation mentions 3 months for the price of one or 50% in their retention offer.

⁷³ MATCHFTC519412.pdf

to me by the FTC also does not include the term “resignation” throughout. While resignation is what Match.com internally refers to as ‘cancellation’, this is new language for users, and the word choice, coupled with the shift in tone and use of first person “I”, adds to further confusion.

As mentioned above, in one version of the 2019 flow,⁷⁴ Match.com’s retention offer uses “Continue” instead of “Continue Cancellation.” In this instance, ‘Continue’ creates ambiguity: what, exactly, is being continued? Does clicking ‘Continue’ kickstart the retention offer and not cancellation, or does ‘Continue’ continue the cancellation process? By switching the buttons’ naming conventions, along with the changes on this specific retention offer page, it creates confusion as to what task is being continued.

Another confusing example involves Page 2 of the cancellation flow (Figure 5), the first survey page. The headline on this page, “Before you go, help us make Match.com better” may have misled some users to believe that this was the final step in the cancellation process. The use of the term “before you go” makes it sound as if the user has already completed the process, and that the survey questions on this page were in fact a post-cancellation survey. Because this page was followed by the retention page, which appeared more like an ad than a clear step in the cancellation process, some users may have believed upon arriving on Page 3 that the cancellation process was complete, and dropped out at that point, when in fact in order to complete the cancellation they were compelled to click through Page 3.

⁷⁴ F01-MG-0028904.webm

III. The Password Authentication Screen

In this section, I review the use of the password authentication screen in depth. As discussed above, the password authentication screen was used as: a source of increased friction to make cancellation more difficult to access; to obstruct users from accomplishing the cancellation task; and as a form of forced action, by requiring users to complete a task unnecessary or unconnected from their primary goal (subscription cancellation). But because password authentication does have a critical and appropriate use, in this section I will review the appropriate justification for password authentication, and provide an analysis of what made Match’s use of it in this flow *inappropriate*.

a. Password Friction: Balancing Users’ Security and Ease of Access

A persistent problem in HCI and user studies is the counterbalance between privacy, security, and ease of use. This is most evident in the provision of password checks: sign-in or verification points at various points in the user flow. The contextual placement of these log-in points can cause undue friction, which leads to site hopping, reduced conversions, and task abandonment.⁷⁵ Password checks, failed attempts to reset passwords and account lockouts cause users to forgo online purchases.⁷⁶ In a study where over half of participants relied on social logins (sign-ins via connected social media platforms such as Facebook), half of participants were prone to abandon a website if asked to provide a password.⁷⁷ The lack of ease in these interactions can compromise the password check’s original goal. In the same study, 12% of participants produced a “variation of an old password” and 2% defaulted to their previous password; 48% participants admitted they

⁷⁵ Young, *supra*.

⁷⁶ “The Current State of Checkout UX-18 Common Pitfalls & Best Practices,” Baymard Institute. <https://baymard.com/blog/current-state-of-checkout-ux>

⁷⁷ “Are Password Resets Costing Your Company?” Beyond Identity Blog, December 17, 2021. <https://www.beyondidentity.com/blog/password-resets-and-the-consumer-journey>

were very likely to abandon the site if they were explicitly told they could not use prior passwords. Evidently, password friction stifles users, yielding inferior or similar passwords, or causing user drop-off altogether.

The password authentication requirement for Match.com users attempting to manage their subscriptions may be described as a “pain point:” a hurdle or obstacle that decreases the quality of customer experience.⁷⁸ It is particularly obstructive because it appears that Match.com users could remain signed-in to their accounts for extended periods of time without receiving a password prompt, as well as access other account settings that posed a greater risk directly to the user if they were compromised, such as editing one’s name, email address, and password.⁷⁹ It appears the greatest risk posed by accessing the “Change/Cancel Membership” setting is to the company, who may experience higher cancellation levels through ease of access. This obstruction qualifies as an *interaction-level* pain point, in which the user experiences navigation difficulty regarding a product or service; as well as a *relationship-level* pain point, in which the user questions the quality of service by the service provider.⁸⁰ Pain points can deter users from task completion by increasing their cognitive load. Several financial institutions have set guidelines to mitigate customer dissatisfaction with online subscription practices. For example, major card companies mandate that online merchants notify customers upgrading their free trials to paid subscriptions prior to

⁷⁸ Sarah Gibbons, Three Levels of Pain Points in Customer Experience. Nielsen Norman Group. (May 16, 2021). <https://www.nngroup.com/articles/pain-points/>

⁷⁹ Based upon evidence provided to me, it appears that when a user is signed into her account, the only point at which she would receive the password authentication screen was during the cancellation flow. I do not have knowledge of how long a user could remain signed in to their Match.com account before being asked to reauthenticate. However, it is common for many websites to allow users to remain signed-in for extended periods of time given how burdensome users can find password authentication.

⁸⁰ Gibbons, *supra*; Achonwa Alvan, What are pain points in design? Educative. <https://www.educative.io/answers/what-are-pain-points-in-design>

charges, as well as provide “clearer instructions about how to cancel.”⁸¹ Additionally, Visa prescribes that customers “must be able to cancel their subscription online with the merchant, without needing to contact the merchant through another channel (e.g. a phone call).”⁸²

These pain points are validated by work communications between Match.com employees. As of February 24, 2016, Match.com’s staff noted: “Also, the majority of members drop out when asked to re-enter their password so I’m not sure if they think they canceled, or if they were just clicking the button for the heck of it.”⁸³ As early as June 05, 2013, Match.com staff indicated:

“We need to take a look at our resignation flow...Currently the flow is very convoluted and confusing. We get a lot of customer care complaints about it. I want to see if there’s a way to clean up the flow, yet optimize it so we can try to save as many people from resigning as possible. If we can plug the hole where people are leaving the site, it can help with our PMC goals.”⁸⁴

We have identified relevant security design principles and practices to evaluate the ease of Match.com’s cancellation. According to the *principle of psychological acceptability*: “security mechanisms should not make the resource more difficult to access than if the security mechanisms were not present.”⁸⁵ Desired resources should not be barred by security checks, and if they are, the

⁸¹ Alex Glaser, Customers fight surprise charges as online subscription surge. NBC News, December 23, 2020. <https://www.nbcnews.com/business/business-news/customers-fight-surprise-charges-online-subscriptions-surge-n1252149>

⁸² Visa Business News, “Reminder: Updated Policy for Subscription Merchants Offering Free Trials or Introductory Promotions.” <https://usa.visa.com/dam/VCOM/global/support-legal/documents/subscription-policy-vbn-visa-public.pdf> (September 26, 2019).

⁸³ MATCHFTC320168_image.pdf.

⁸⁴ MATCHFTC417535.pdf.

⁸⁵ Matt Bishop, *Computer Security: Art and Science*. Chapter 13: Design Principles, Page 348. Boston, MA: Addison-Wesley, 2003.

principle indicates that the burden imposed onto users in passing these checks must be *minimal* and *reasonable*. From the evidence aforementioned, I question whether the security check at the point of membership cancellation is reasonable for users, given Match.com allows users to remain logged-in for extended periods of time. In addition, I challenge the placement of the password screen in contrast to other account settings.

In the evidence reviewed, I did not observe the password screen invoked at any other point in any of the videos during various iterations of website usage.⁸⁶ In documents depicting the “Account Settings” from 2016 and 2019, the “Change/Cancel Membership” setting is the only one requiring a password—although several other settings could feasibly put the user’s account security and integrity at greater risk from an adversary having unauthorized access to a legitimate account. Specifically, in the video Match Cancellation Process_10-12-2022.wmv, the user repeatedly clicks “back to home” and then proceeds through the flow clicking on multiple settings, then returns to the “Change/Cancel Membership” setting and is not required to authenticate again. This breaks the flow Match.com has introduced with the requirement of password authentication. With this break in the security pattern, it appears that the use of the password by Match.com is not a security measure, but one designed to create friction; if this was a choice motivated by security concerns, why does the site not require the user to sign in repeatedly each time they selected “Change/Cancel Membership”? To be clear, I am not recommending this behavior, but instead highlighting an inconsistency in the design flow. If this authentication step were truly a security feature, it would be consistent in terms of when the user has to sign in, such as upon returning to the home page. But instead, the password is not consistently required, and thus is a questionable security measure.

⁸⁶ I assume in all the videos I reviewed that the user had already logged into the website at some point prior to the recording session.

I conclude that the presentation of the password screen during the cancellation process is arbitrarily placed compared to other account settings. Match.com's cancellation flow, in regard to its password friction, does not satisfy the *principle of psychological acceptability*. The placement of the password screen fails to be reasonable or minimal; obstructs user access unnecessarily; and deters legitimate users from resources on their account that should be readily accessible.

5. Conclusion: Putting the Heuristic Analysis into Perspective

This analysis demonstrates that the Match.com cancellation flow was neither easy to find nor easy to use throughout the entire timespan of my analysis. I mapped the evolution of the cancellation flow from the years 2016, 2019, and 2022. I marked introductions and changes to password screens, buttons, links, and copywriting. Based on this evolution, I concluded the following:

1. The cancellation flow fails to make visible what stage in the process users are in (see “Visibility of System Status”).
2. The process suffers from inconsistent design, terminology and language, thus confusing users (see “Consistency and Standards”).
3. Extraneous steps slow down the cancellation process. Password screens, surveys, and retention offers introduce unnecessary friction into the user journey (see “Aesthetic and Minimalist Design”).

While Match.com can, at their discretion, implement password checks, offer retention deals, and survey users, it is the *placement* of these items within the cancellation process that makes it difficult for users to complete. There are better placements for these items that do not obstruct the cancellation process.

Match.com Cancellation Process 2022 from Match Cancellation Process_10-12-2022.wmv

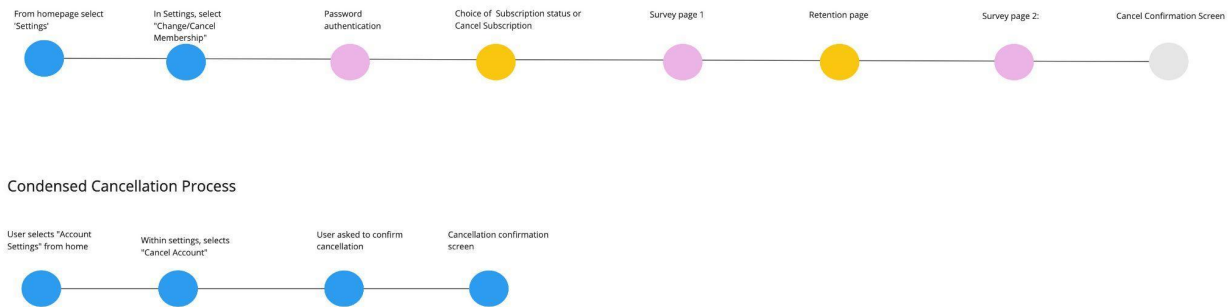


Figure 15: A comparison of the existing cancellation process as compared to a condensed process

The inclusion of these extraneous steps increased the length of the flow by at least four steps, as Figure 15 demonstrates above. As a comparison, I created a condensed cancellation process consisting of the following steps:

1. From home page, select Account Settings;
2. Within the Account Settings, select “Cancel Account”;
3. Confirm cancellation;
4. Receive cancellation confirmation.

In this section, I will conclude my analysis first by drawing upon evidence provided to me by the FTC of internal discussions by Match.com employees about the cancellation flow, which can provide context for the problems I identified. Second, I will briefly talk about the larger landscape of concerns with dark patterns in subscription cancellations, focusing on practices by Match.com competitors, and then reviewing the larger policy context in which dark patterns are a focus of subscription cancellations.

A. Evidence from Company Documents

After concluding my heuristic analysis of the website, I reviewed internal company documents provided to me by the FTC. I found that the documents supported the conclusions I have drawn in this report. Multiple documents validated the existence of customer complaints regarding Match.com's cancellation flow. There is evidence in the documents I reviewed that Match.com employees were aware that the cancellation process is problematic, with one employee noting in 2016 that "honestly it's been the same complaint for the past decade that I've been with Match ... it takes up to 7 or 8 clicks to complete the flow to turn off AR . . . even if you can figure out how to do it. Also, the majority of members drop out when asked to re-enter their password."⁸⁷ One exchange with customer support personnel, from 2015, highlights user abandonment with the retention page in particular: "The cancel/resign flow is like 5 steps. Many times the users think once they click "resign" that they are done. They're not, they have to click through the nag screens. Michele complained about this for years, but Product would not reduce the resign steps. It's not a bug. It's a feature."⁸⁸

Another exchange from 2016 highlights that employees understood that "customers complain that they cancel and we still auto renew them," suggesting the survey was problematic, that there was confusing language, and that "there is no doubt that the resignation flow is extraneous and potentially confusing."⁸⁹ A technical resolutions supervisor, also in 2016, discussed in a long email memo that as of May they had already had over 1K complaints, and "[w]e believe we can make

⁸⁷ MATCH320168_image.pdf

⁸⁸ MATCHFTC519412.pdf

⁸⁹ MATCH543542.pdf

this process easier for our members who are already wanting to cancel (they've made it to the flow) but get stuck on survey pages, retention offers, etc and believe they canceled . . . by shortening the flow, we could make sure members who are wanting to cancel and who are already in the cancel the flow are able to complete cancellation successfully.”⁹⁰ In another, employees offered the following: “I want to see if there’s a way to clean up the flow, yet optimize it so we can try to save as many people from resigning as possible. If we can plug the hole where people are leaving the site, it can help with our PMC goals.”⁹¹

One aspect of the process that the internal documents illuminate is the arbitrariness of the password authentication step. Despite wide-ranging conversations about issues with the cancellation process, there is no mention of a security issue requiring password authentication. In fact, one presentation discussing the cancellation process documented the steps with this note: “Enter Password (Why?)”.⁹² One staff member indicated that “the majority of members drop out when asked to re-enter their password so I’m not sure if they think they canceled, or if they were just clicking the button for the heck of it.”⁹³ From this communication, it is evident that the password screen caused users to flee the cancellation procedure without a clear understanding of their cancellation status. When reviewing Match.com’s *proposed* solutions to this problem, I found that one solution did not require password entry at all.⁹⁴ Instead, it notifies users of the 6-month subscription renewal date and chargeable amount, and provides three checkbox options: “Turn off automatic billing,”

⁹⁰ MATCH464887.pdf

⁹¹ MATCHFTC417535.pdf, *supra*.

⁹² MATCHFTC543666.pdf

⁹³ MATCHFTC320168_image.pdf, *supra*.

⁹⁴ MATCH491446.pdf

“Hide profile,” and “Permanently delete account.” A blue, rounded “Save Changes” button and a “Help” link accompany the three options. The proposed solution is followed by a caption:

“Proposed cancellation flow does not require re-entry of password, and provides simple and descriptive options for the member to choose from. Sometimes members just want to prevent future billing, and sometimes they want their account “removed” entirely. Once the “save changes” button is pressed, the member will see a cancel confirmation page and have the option to complete a survey.”

The proposed solution is clearer and more concise than the eight page/step cancellation flow. The most profound takeaway is that a cancellation flow without password authentication had the potential to simplify the customer journey. Moreover, this pitch pushes the survey form to *after* the cancel confirmation page and makes it *optional*. This solution was not implemented in the documents I received.

In addition to the password authentication issue, there are several documents proposing changes to the overall process to address customer dissatisfaction. The cost of hidden information becomes clear; in MATCHFTC543666, a PowerPoint presentation, Slide 2 notes that “We spend over \$1M per year to handle related Care contacts,” and that “Over half of member help searches are related to just 10 of our 400 FAQs. Guess what they’re related to—cancellations.”⁹⁵ Another email exchange from 2014 appears to document cancellation flow abandonment from the password page at a discrete moment in time (documenting a 80% click-through rate to the password authentication

⁹⁵ MATCHFTC543666.pdf

page, and then a dramatic 6% click-through rate to following page, which appeared to be the retention offer at this stage in time, a drop of approximately 94% from the first page where the calculations were made).⁹⁶ Proposed changes, in addition to those described above in relation to password authentication, included shortening the overall process down to seven steps,⁹⁷ and moving the survey to a post-cancellation step.⁹⁸

Finally, it is important to note that while this evidence demonstrates that some employees quantified the cost to the company of customers' need to contact customer service to cancel their accounts, their accounting does not capture the costs accrued by the customer in excess of any additional direct costs from uncanceled subscriptions, such as time spent trying to find another means to cancel, time invested in contacting and working with an agent to execute the cancellation process, and any frustration experienced from this process. These are harms attached to the dark patterns we described in Section 4.B.II.

B. Competitor Practices

For comparison purposes, I conducted a heuristic analysis of two competitor websites that are not owned by Match.com's parent company: Facebook Dating and Coffee Meets Bagel, and their cancellation processes.⁹⁹ Below, I have attached a visualization of the cancellation process. Yellow represents the element of dark pattern(s) and pink represents frictions. Each step starts after the

⁹⁶ MATCHFTC312903.pdf

⁹⁷ Id.

⁹⁸ Id., MATCHFTC491442.

⁹⁹ Note that these reviews were conducted on the mobile versions of these services.

user has already found their settings (omitting the click for the user to get to their settings page). Coffee Meets Bagel had four steps with one step being friction-filled; a survey that was not marked optional. Facebook Dating has two different flows, one with a user able to ‘skip’ a survey, and one where a user completes out the survey. The Facebook ‘skip’ survey flow has three steps and no friction, but the flow with survey has four steps, with two survey pages.

However, the shortest version of the Match.com cancellation flow is from 2022,¹⁰⁰ which has four steps and apparently no retention offer page if the user selects the survey choice indicating that they have met someone. All other Match.com choices yield six steps within the cancellation, meaning the shortest Match.com flow is still the longest option of the competitors analyzed. Additionally, Match.com was the only product that had dark patterns and frictions in their user cancellation flows, in comparison to Facebook Dating and Coffee Meets Bagel. Relatedly, Match.com had each of the frictions from all of the Facebook Dating and Coffee Meets Bagel flows. Match.com’s flow had more friction and more dark patterns, than the two other competitors analyzed for this report.

¹⁰⁰ MATCHFTC672321.wmv

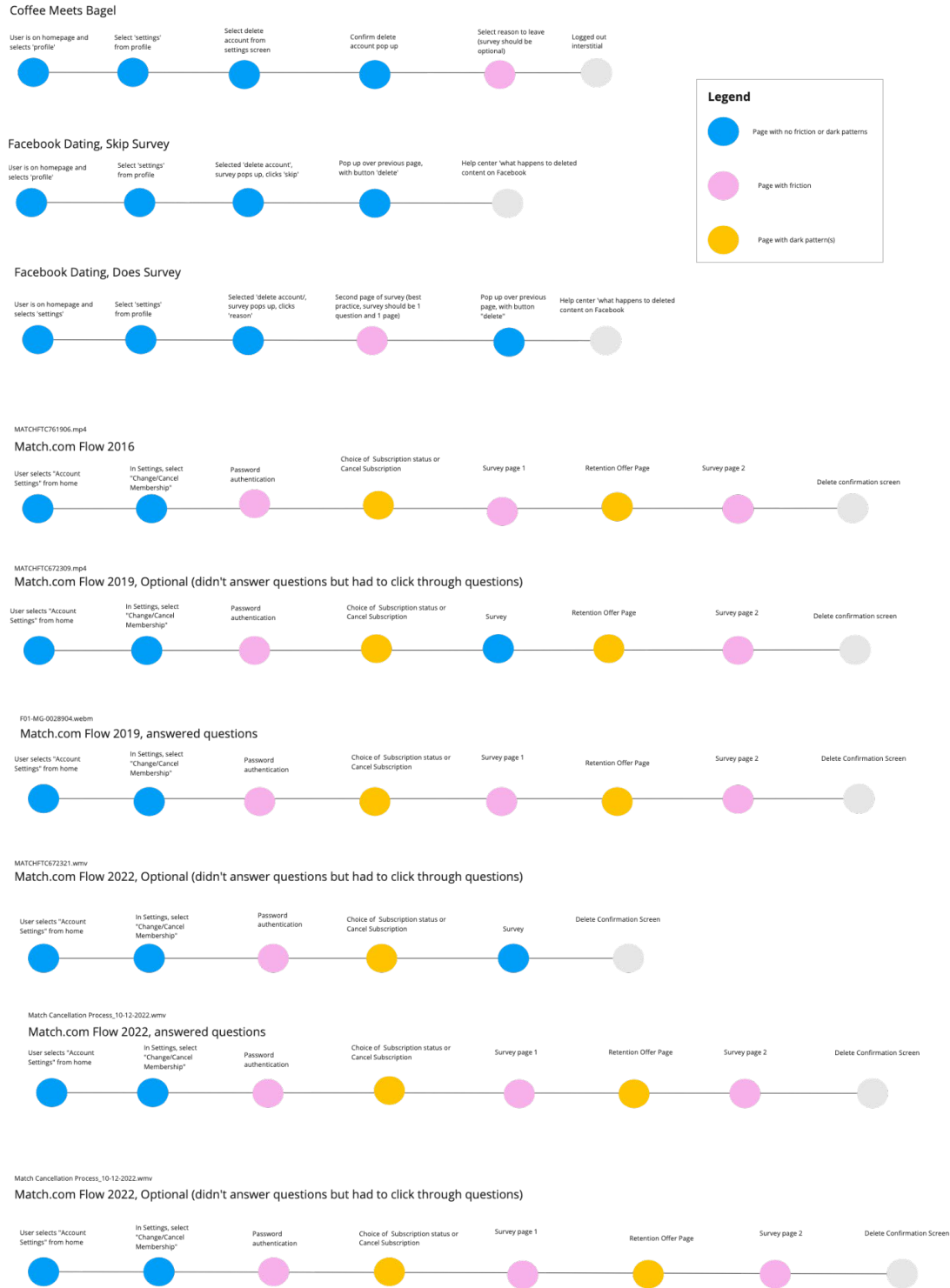


Figure 16: Comparison of cancellation flows between Match.com, Coffee Meets Bagel, and Facebook Dating

C. Conclusion

In conclusion, based on the evidence I have reviewed, I find the Match.com cancellation process neither easy to find nor easy to use, but instead plagued by noncompliance with design heuristics and dark patterns. Furthermore, the evidence I have reviewed demonstrates that the company was aware of these problems for potentially for a decade-plus, and yet chose not to address them. The result of these problems was to make it difficult, if not impossible, for many Match.com users to cancel their subscriptions using the online cancellation process, with many believing that they had canceled their subscriptions when in fact, they had not, thus accruing additional charges. Based on the documents I reviewed, it appears that many customers had to find other routes to contact the company outside the online cancellation process, but that those methods were also difficult to locate, and required additional and disproportionate investments of time by customers.

The analysis and opinions contained in this report are based on information available as of the date of the report. I reserve the right to supplement or amend this report should any additional information become available including, but not limited to, any expert reports submitted on behalf of defendants, deposition transcripts, and other information unavailable as of the date of this report.

I understand that this report may be used in a law enforcement proceeding. Pursuant to 28 USC Section 1746, I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct to the best of my knowledge and belief.

A handwritten signature in black ink that reads "Jennifer King, Ph.D." The signature is written in a cursive style with a large, stylized 'J' and 'K'.

/S/

Jennifer King, Ph.D

January 13, 2023

Berkeley, California

Appendix I: Dr. King's CV

Jennifer King, Ph.D, MIMS

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415-990-8227

Research Summary

I am an information scientist whose research sits at the intersection of human-computer interaction and public policy. My specific research focus is information privacy—how the public makes choices about their personal data in the context of their relationships with institutional actors, how the design of technology impacts these decisions, and how legal and policy infrastructures impact these choices. I use both quantitative and qualitative methods to examine these issues, focusing both on the role of interface design as well as social structure on individual decision-making.

Present Role

Privacy and Data Policy Fellow, Stanford Institute for Human Centered Artificial Intelligence Jan. 2021-present
At HAI I conduct information privacy research with a specific focus on artificial intelligence, as well as work with Professors Sarah Billington and James Landay on a research project examining the impact of sensors used in workplace environments to promote health and well-being. In this role I also engage with and advise policymakers, legislators, and governmental entities on issues related to information privacy, as well as collaborate with HAI colleagues on promoting interdisciplinary policy-focused research at Stanford. Co-instructed the [National Research Cloud policy practicum](#) with Professor Dan Ho and HAI Director of Policy Russell Wald in winter/spring 2021.

Education

University of California, Berkeley School of Information

Ph.D, Information Management and Systems

2009 – May

2018

- My dissertation, “Privacy and Social Exchange Theory,” used a social relational framework to explore consumer motivations for disclosing personal information to companies. I employed both qualitative and experimental methods for this research. It was selected as the runner up in the Information Schools (I-Schools) Organization’s 2019 Best Dissertation Award. Dissertation advisors: Deirdre Mulligan, Coye Cheshire, Steve Weber, and David Wagner.
- Focus areas: human-computer interaction, social computing, and information law and policy.
- Research funded by grants from the Center for Long Term Cybersecurity (inaugural grantee), the National Science Foundation through TRUST (Team for Research Through Ubiquitous Secure Technology) and the I3P (Institute for Information Infrastructure Protection).
- Co-director of the student led Center for Technology, Society & Policy for the 2016-2017 academic year. CTSP funds fellows and projects, organizes events, and hosts speakers supporting our four focus areas: engineering ethics, digital citizenship, evaluating technology policy, and supporting future technologists.

University of California, Berkeley, Masters of Information Management and Systems (MIMS)

2006

University of California, Irvine, B.A., Political Science (Honors) and Sociology

1994

Professional and Research Experience

Director of Consumer Privacy, Center for Internet and Society, Stanford Law School April 2018-Dec. 2020

In this role I conducted privacy-focused research in the public interest on topics such as genetic privacy, the Internet of Things, notice and consent, and artificial intelligence. I actively participated in the management of the Center, including strategic planning for research and fundraising. I also engaged with and advised policymakers, legislators, and governmental entities on issues related to information privacy.

Co-Director, Center for Technology, Society & Policy, UC Berkeley

Aug. 2016 – July 2017

Co-director of the student led CTSP for the 2016-2017 academic year. CTSP funds fellows and projects, organizes events, and hosts speakers supporting our four focus areas: engineering ethics, digital citizenship, evaluating technology policy, and supporting future technologists.

Contract Litigation Consultant/Expert Witness

2010 –

present

I provided expert services to clients (Federal Trade Commission, Federal Reserve Board, State of Washington, City of Santa Monica, City of Santa Cruz, and others) focusing on online disclosures, negative option continuity programs, online credibility, deception, and general website usability issues.

Major Cases include:

- Testifying Expert, FTC vs. Amazon (2:14-cv-01038-JCC). I completed an expert report, rebuttal report, and was deposed. My expert report provided a heuristic analysis of the in-app purchase process as well as an analysis of thousands of customer complaints. The case was decided on summary judgment in favor of the FTC, finding Amazon liable for unauthorized in-app purchases by children on the Kindle Fire tablet.
- Testifying Expert, FTC vs. Commerce Planet (8:09-cv-01324-CJC(RNBx)). I completed an expert report, rebuttal report, was deposed, and testified at trial. The substance of my report was a heuristic evaluation of a portion of the Commerce Planet website to determine the clarity and conspicuousness of negative option marketing disclosures to consumers. The case resulted in a permanent injunction, restitution, and disgorgement against the defendant for deceptive and unfair practices violating Section 5(a) of the FTC Act.

Research Specialist, Samuelson Law, Technology, & Public Policy Clinic, U.C.B. Law, Berkeley, CA 2007-2009

- Utilized information science, social sciences, and experience in technology development and human-computer interaction to perform empirical research and develop policy recommendations focused on privacy issues with Internet technologies, ubiquitous computing and sensor networks, including RFID and video surveillance systems.

Paranoid Yahoo!, Yahoo! Data Security (Paranoid) Team (contract), Sunnyvale, CA

2006

- The Paranoid team worked to protect the privacy and integrity of Yahoo! user data worldwide.
- Developed strategic initiatives to combat password “phishing” threats for Yahoo! Users.
- Evaluated internal and external applications for data privacy and integrity threats, developing applications and internal policy.

Researcher, Electronic Frontier Foundation, San Francisco, CA

2005

- Investigated privacy policies governing user data on major search engines and privacy issues related to radio frequency identification (RFID) for EFF, a non-profit group that advocates for Internet civil rights, privacy, and free speech.

Customer Trust Product Manager, Yahoo! Community Services, Sunnyvale, CA

3.03 – 7.04

- The Customer Trust Manager role was a new position created on the Product Management team to combat abuse and illegal uses of Community properties, and to be an advocate for Yahoo! customers. This was one of the first Trust & Safety roles in the industry.
- Developed strategic and tactical Community anti-abuse initiatives, and evangelized these efforts across the company, working closely with legal, policy, data security, and various product teams.
- Focused on investigating deviant and anti-social users of Community products, and performed an extensive qualitative and quantitative analysis of a criminal user population to create policies and build software tools for

content moderation in order to curb their usage of the service; this effort decreased their content contributions to Yahoo! by over 80%.

Associate Product Manager, Yahoo! Personals, Sunnyvale, CA

9.02 –

3.03

- Managed feature development from conception to completion, working with marketing, interaction and visual design, web development, engineering, and quality assurance teams.
- Drove development of front-end and back-end features, including video greetings, direct marketing programs, and internal customer care tools.
- Led the creation of anti-fraud initiatives, increasing customer retention and recapturing over \$4M in annual revenue.

Senior Producer, Kaplan Tech West, a subsidiary of Kaplan, Inc. Oakland, CA

10.00 – 9.02

- Kaplan Inc. is an international educational services company. Kaplan Tech West was Kaplan's primary software development team, charged with building an online distance-learning platform.
- Oversaw end-to-end development of the learning platform's XML-based content authoring system, including requirements gathering, usability testing and evaluation, interface design, and user training.
- Performed a detailed semantic analysis of Kaplan instructional content, and worked with data architects to refine models for encoding Kaplan content in XML.

Producer, Desktop.com, San Francisco, CA

7.00 – 10.00

- Created new applications for Desktop's Internet-based computer desktop product, performed market research and analysis of key competitors, and designed interface improvements to existing applications.

Assistant Producer, Productopia.com, San Francisco, CA

5.99

– 7.00

Peer Reviewed Journal and Conference Papers

Mulligan, D.K., Regan, P.M. and **King, J.** (2020), The Fertile Dark Matter of Privacy takes on the Dark Patterns of Surveillance. *J. Consum. Psychol.*, 30: 767-773. <https://doi-org/10.1002/icpy.1190>

Jennifer King. 2019. "Becoming Part of Something Bigger": Direct to Consumer Genetic Testing, Privacy, and Personal Disclosure. *Proc. ACM Hum.-Comput. Interact.* 3, CSCW, Article 158 (November 2019), 33 pages. <https://doi.org/10.1145/3359260>

Christopher Thompson, Maritza Johnson, Serge Egelman, David Wagner, and **Jennifer King.** "When It's Better to Ask Forgiveness than Get Permission: Attribution Mechanisms for Smartphone Resources." Presented at the Symposium on Usable Privacy and Security, July 2013. Newcastle, UK.

Jennifer King, Airi Lampinen, and Alex Smolen. "Privacy: Is There An App For That?" Presented at the Symposium on Usable Privacy and Security, July 2011. Pittsburgh, PA.

King, Jennifer and Selcugoklu, Aylin. "Where's the Beep? User Misunderstandings of RFID." In Proceedings of 2011 IEEE International Conference on RFID.

M. Meingast, **J. King,** D. Mulligan. "Embedded RFID and Everyday Things: A Case Study of the Security and Privacy Risks of the U.S. e-Passport." In Proceedings of IEEE International Conference on RFID, March 2007.

M. Meingast, **J. King,** D. Mulligan. "Security and Privacy Risks of Embedded RFID in Everyday Things: the e-Passport and Beyond," *Journal of Communications*, 2(7), 2007.

Law Review Articles and Refereed Workshop Publications

Jennifer King and Adriana Stephan. Regulating Dark Patterns in Practice – Applying the California Privacy Rights Act. *Georgetown Technology and Law Review*. 5 *Geo. L. Tech. Rev.* 251 (2021).

Jennifer King, Richmond Wong, Rena Coen, Jael Makagon, and Andreas Katsanevas. “This All Seemed Fairly Normal To Me” □ The Absence of Effect of Privacy Policy Links on Invasive Personal Disclosure. Presented at the Privacy Law Scholars Conference (invitation only), May 2019, Berkeley, CA.

Jennifer King, “Privacy, Disclosure, and Social Exchange Theory.” UC Berkeley dissertation, filed May 2018. A draft of this work was presented at the Privacy Law Scholars Conference (invitation only), June 2015, Berkeley, CA.

Jennifer King, “Understanding Privacy Decision-Making Using Social Exchange Theory.” Presented at The Future of Networked Privacy: Challenges and Opportunities workshop, CSCW March 2015.

Jennifer King. “Taken Out of Context: An Empirical Analysis of Westin’s Privacy Scale.” Presented at the Workshop on Privacy Personas and Segmentation (PPS) at SOUPS, July 2014. Menlo Park, CA, USA.

Deirdre K. Mulligan and **Jennifer King**. “Bridging the Gap Between Privacy and Design.” *University of Pennsylvania Journal of Constitutional Law*, Vol. 14, Issue 4, 2012. Selected as a Leading Paper for Policymakers by the Future of Privacy Forum, 2012.

Jennifer King. “How Come I’m Allowing Strangers To Go Through My Phone?: Smartphones And Privacy Expectations.” Presented at the [Workshop on Usable Privacy and Security for Mobile Devices \(U-PriSM\)](#) at SOUPS, July 2012. Washington, D.C., USA. Note: This paper was also presented at the Privacy Law Scholars Conference (invitation only), June 2012, Washington, D.C., USA. Selected as a Leading Paper for Policymakers by the Future of Privacy Forum, 2012.

Jennifer King and Deirdre K. Mulligan. “Reconceptualizing Privacy for Social Media Research and Design.” Presented at *Reconciling Privacy with Social Media* workshop, CSCW, 2012.

Jennifer King and Andrew McDiarmid. “Where’s The Beep? Security, Privacy, and User Misunderstandings of RFID.” In proceedings of USENIX Usability, Security, and Psychology. San Francisco, CA, April 14, 2008. Available at: <http://portal.acm.org/citation.cfm?id=1387652>

Egelman, Serge, **King, Jen**, Miller, Robert C., Ragouzis, Nick, and Shehan, Erika. “Security User Studies: Methodologies and Best Practices.” Extended abstracts of the ACM Conference on Human Factors in Computing Systems (CHI 2007). San Jose, CA, USA, April 28, 2007.

Research Reports and White Papers

Daniel Ho, **Jennifer King**, Russell Wald, and Chris Wan. Building A National AI Research Resource: A Blueprint for A National Research Cloud. White Paper: Stanford Institute for Human-Centered Artificial Intelligence, October 2021. Available at: <https://hai.stanford.edu/policy/national-research-cloud>

King, Jennifer; Flanagan, Anne; Warren, Sheila. Redesigning Data Privacy: Reimagining Notice & Consent for Human-Technology Interaction. White paper report: World Economic Forum, 30 July 2020. Available at: <https://www.weforum.org/reports/redesigning-data-privacy-reimagining-notice-consent-for-humantechnology-interaction>.

Hoofnagle, Chris; **King, Jennifer**; Li, Su; and Turow, Joseph. "How Different are Young Adults from Older Adults When it Comes to Information Privacy Attitudes and Policies?" April 14, 2010. Available at: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1589864. Selected as a Leading Paper for Policymakers by the Future of Privacy Forum, 2010.

Turow, Joseph; **King, Jennifer**; Hoofnagle, Chris; Bleakley, Amy; and Hennessey, Michael. "Americans Reject Tailored Advertising and the Three Activities That Enable It." September 29, 2009. Available at: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1478214

Jennifer King, Deirdre Mulligan, and Steven Raphael. "CITRIS Report: An Evaluation of the Effectiveness of the City of San Francisco's Community Safety Cameras." Presented before the City of San Francisco Police Commission, January 2009. Available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2183381

Chris Jay Hoofnagle and **Jennifer King**. "Research Report: What Californians Understand About Privacy Online." September 3, 2008. Available at: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1262130

Chris Jay Hoofnagle and **Jennifer King**. "Research Report: What Californians Understand About Privacy Offline." May 15, 2008. Available at: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1133075

Jennifer King and Chris Jay Hoofnagle, "A Supermajority of Californians Support Limits on Law Enforcement Access to Cell Phone Location Information," February 2008. Available at: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1137988

Chris Jay Hoofnagle and **Jennifer King**. "Consumer Information Sharing: Where The Sun Still Don't Shine," December 2007. Available at: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1137990

Op-Eds and Popular Press

Jennifer King. "[A Bill Designed to Protect Kids Could Change the Internet for the Better.](#)" Tech Policy Press, September 15, 2022.

Jennifer King and Eli MacKinnon. "[Do the DMA and DSA Have What It Takes to Take on Dark Patterns.](#)" Tech Policy Press, June 23, 2022.

Jennifer King. "[Opinion: After Rape Survivor's Arrest, It's Time To Rethink Genetic Databases.](#)" *The Washington Post*, Feb. 17, 2022.

Jennifer King and Jael Makagon. "[The fallacy behind private surveillance cameras in San Francisco.](#)" *Cal Matters*, August 9, 2020.

Jen King. "[Change your phone settings so Apple, Google can't track your movements.](#)" *The Conversation*, Jan. 14, 2019.

Invited Talks & Panels

Regulating Artificial Intelligence Through Data Protection. [Global Privacy Assembly](#), Keynote Speaker, October 18, 2021.

[Bringing Dark Patterns To Light—An FTC Workshop](#). Panelist, April 29, 2021.

[Dark Patterns, Icons and Toggles: A Conversation on Design and Regulation](#). IAPP Global Summit, April 23, 2021. (panelist)

[Dark Patterns: Manipulative UX Design and the Role of Regulation](#). Future of Privacy Forum, March 24, 2021. (main presenter)

[The Rise of Trust Brokers](#). World Economic Forum Sustainable Development Impact Summit, Sept. 24, 2020.

[“Notice, Consent, and Disclosure in Times of Crisis.”](#) Atlantic Council Data Salon Series, May 27, 2020.

“Integrating Privacy, Personal Disclosure, and Social Exchange Theory: An Experimental Test.” [Ostrom Workshop Colloquium](#), Indiana University, Bloomington, IN, October 21, 2019.

[The Trust Paradox: The Future of Privacy and Transparency in the Digital Economy \(panel\)](#). The Churchill Club, San Mateo, CA, March 29, 2019.

“The Cambridge Analytica Debacle,” International Association of Defense Counsel, Santa Barbara, CA, February 27, 2019.

“Privacy, Anonymity, and Consent.” [Conference On Mobile Position Awareness Systems and Solutions](#), San Francisco, CA, Sept. 7, 2018.

Data Privacy Day (panel), World Economic Forum Center for the Fourth Industrial Revolution, San Francisco, CA, June 5, 2018.

[Designing Trustable Products: Microinteractions Matter For Secure UX](#) (panel). O’Reilly Design Conference, March 22, 2017.

Security & Human Behavior, Harvard Law School, May 2016.

TRUSTe Internet of Things Privacy Summit, June 17, 2015. Panelist, “Enabling Smart Cities: Planning for Privacy.”

In Short – Advertising and Privacy Disclosures for a Digital World. Federal Trade Commission workshop, May 30, 2012. – Opening speaker and panelist.

How To Personalize Without Being Creepy. SXSW Interactive – March 14, 2011. Austin, TX. – Panelist.

“A Supermajority of Californians Support Limits on Law Enforcement Access to Cell Phone Location Information,” given at the 37th Research Conference on Communication, Information and Internet Policy (TPRC), September 26, 2008, George Mason University, Alexandria, VA.

“Where’s the Beep? Security, Privacy, and User Misunderstandings of RFID,” given at “Pay On The Go: Consumers and Contactless Payment,” Federal Trade Commission Town Hall Meeting, July 24, 2008, University of Washington, Seattle, WA. – Panelist.

“The State of CCTV in the United States,” given at the 3rd Annual Surveillance and Society Conference “InVisibilities: The Practice and Experience of Surveillance in Everyday Life,” April 3, 2008, University of Sheffield, Sheffield, England, UK.

“CCTV: Developing Privacy Best Practices,” Department of Homeland Security Workshop, December 17-18, 2007, Alexandria, VA. – Panelist

“Sensors as Disruptive Technology: Guidelines for Future Development,” given at the IBM Sensor Day, October 2007, UC Berkeley, Berkeley, CA.

“Embedded RFID and Everyday Things: A Case Study of the Security and Privacy Risks of the U.S. e-Passport,” given at the IEEE International Conference on RFID, March 2007, Grapevine, TX.

“RFID: A Case Study of the Risks and Benefits of Location-Aware Technologies,” given at the O’Reilly Emerging Technology Conference, March 8, 2006, San Diego, CA.

Awards, Honors and Service

Awards:

Best Dissertation Award, Runner-Up: Information Schools (I-Schools) Organization, 2019

Selected leading paper, Future of Privacy Forum’s Annual Privacy Papers for Policy Makers Award, 2012 (two papers) and 2010. *This Award recognizes leading privacy scholarship that is relevant to policymakers in the United States Congress, at U.S. federal agencies and for data protection authorities abroad.*

UC Berkeley School of Information Dr. James R. Chen Award for Outstanding Master’s Final Project “Social Uses of Communication Backchannels in a Shared Physical Space,” 2006.

Public Service:

Committee Member, California State Advisory Board on Mobile Privacy Policies, 2012

Member, State of California RFID Advisory Board, 10.07 – 3.08

Leadership Roles (Conferences and Workshops):

Program Committee, *Symposium on Usable Privacy and Security*, 2020

Organizer, *Redesigning Consent for Better Data Protection*, Oct. 2-3, 2019. Co-hosted with the World Economic Forum Center for the Fourth Industrial Revolution, San Francisco, CA

Program Organizer, *Workshop on Privacy Indicators and The Future of Privacy Indicators Workshop*, SOUPS, June 2016

Program Organizer, *Bridging the Gap Between Privacy by Design and Privacy in Practice*, CHI, May 2016

Program Organizer, *Privacy By Design: Privacy Enabling Design*, Computing Community Consortium, May 2015

Program Organizer, *Security User Studies: Methodologies and Best Practices*, CHI Workshop, 2007

Committee Member, *Privacy & Power: Acknowledging the Importance of Privacy Design for Vulnerable Populations*, CHI Workshop, 2020

Committee Member, *Ubiquitous Privacy: Research and Design for Mobile and IoT Platforms*, CSCW Workshop, 2019

Committee Member, *The Future of Networked Privacy: Challenges and Opportunities*, CSCW Workshop, 2015

Committee Member, *Measuring Networked Privacy*, CSCW Workshop, 2013

Conference & Journal Reviewing:

CSCW: 2019, 2017, 2016, 2015, 2013

International Workshop on Privacy Engineering – IWPE 2016

CHI: 2020, 2019, 2018, 2014

IEEE RFID 2012

Appendix II: List of all cases Dr. King was deposed or testified at trial

Dr. Jen King, Testifying Roles and Depositions as of Jan. 2023

Testifying Roles:

- 2012: FTC vs. Commerce Planet (8:09-cv-01324-CJC(RNBx))

Depositions:

- 2022: State of Arizona vs. Google (CV 2020-006219)
- 2022: Washington D.C. vs. Instacart (2020 CA 003777 B)
- 2015: FTC vs. Amazon (2:14-cv-01038-JCC)